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EXHIBIT E

[redacted] – [redacted]

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

BARCO, INC. and BARCO NV, Plaintiffs, v. YEALINK (USA) NETWORK TECHNOLOGY CO., LTD., and YEALINK NETWORK TECHNOLOGY CO., LTD. Defendants.	Case No. 2:23-CV-0521-JRG-RSP

EXPERT REPORT OF MICHAEL C. BROGIOLI, PH.D.

Dr. Michael C. Brogioli
Austin, TX

April 27, 2025

[redacted] – [redacted]

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I. INTRODUCTION

1. I am over the age of eighteen. I have been retained by Plaintiffs Barco, Inc. and Barco NV (collectively refer to as "Barco") to provide expert testimony in Barco's action against Yealink (USA) Network Technology CO., Ltd. and Yealink Network Technology Co., Ltd. (collectively refer to as "Yealink"). I am being compensated at my standard consulting rate for my time spent on this matter through Elysium Digital LLC, who I understand charges $950 per hour of my time. My compensation is not contingent upon the testimony I provide or the outcome of this matter.

2. I have prepared this report at the request of counsel for Barco. This report provides my opinions regarding U.S. Patent Nos. 10,762,002 (BARCO_0002692) (the "'002 Patent"), 10,795,832 (BARCO_0005137) (the "'832 Patent"), 10,904,103 (BARCO_0007517) (the "'103 Patent"), 11,258,676 (BARCO_0008254) (the "'676 Patent"), 11,403,237 (BARCO_0009616) (the "'237 Patent"), and 11,422,951 (BARCO_0010815) (the "'951 Patent") (collectively, the "Asserted Patents"); the sample products I have inspected, which include the Barco ClickShare CX-30, the Barco ClickShare Button, the Yealink Meeting Bar A20, the Yealink RoomCast, the Yealink WPP30, the Crestron Electronics, Inc. ("Crestron") AirMedia Receiver AM-3200-WF Receiver and AM-TX-100 Adaptor products (collectively referred to as the "Sample Products"); and similarly configured products sold by Barco, Yealink, and Crestron.

3. This report is submitted pursuant to Federal Rule of Civil Procedure 26(a)(2), and sets for the opinions as to which I, if asked, will testify at trial with respect to the Asserted Patents and Sample Products, along with the bases and reasons for those opinions. In addition, if asked, I may respond to the testimony and any opinions of Yealink's witnesses regarding issues within my area of expertise. I reserve the right to supplement the opinions expressed in this report, including

opinions based on any fact or expert discovery occurring after the date of this report or if I am asked by counsel for Barco to consider additional information.

II. QUALIFICATIONS

4. A copy of my curriculum vitae ("CV") is submitted with this report as Appendix A.

III. BACKGROUND

5. I understand that Barco is a technology company that makes, uses, offer for sale and sells many products including Medical Displays, Digital Operating Rooms, Wireless Conferencing and Collaboration Tools, Virtual & Hybrid Classrooms, Projectors, Image processors, Video Walls, Control Rooms and Immersive Systems. This action concerns Barco's Wireless Conferencing and Collaboration Tools offered for sale under the Clickshare® registered trademark. ECF 1, Complaint; BARCO_0066429-BARCO_0066440

6. I understand that Barco owns a patent portfolio which includes the Asserted Patents. In my opinion, the Asserted Patents describe and claim Barco's patented Tools for Collaboration ("Tools").

7. I understand that Crestron sells Tools in the United States. I understand that Crestron has obtained a license from Barco regarding multiple patents, which includes the Asserted Patents.

8. I understand that Yealink has sold and, in my opinion, continues to support the use of Tools in the United States. I also understand that Yealink admits its WPP30 Presentation Pod ("WPP30"), and WPP20 Presentation Pod ("WPP20") when used with a connected device, infringed claims 1-7 and 10 of the '002 Patent; its WPP30 and WPP20 infringed claims 1-4, 6-8-13-14, and 16-19 of the '832 Patent; its WPP30 and WPP20 infringed claims 1, 2, 16-17, and 19-20 of the '103 Patent; its WPP30 and WPP20 infringed claims 1, 2, 16-17 and 19-20 of the '103

[redacted] – [redacted]

Patent; its (1) A20-020-TEAMS Video Bar ("MeetingBar A20") and (2) WPP30 or WPP20, when used and only when used together in the same system, infringed claims 1-20 of the '676 Patent; its (1) MeetingBoard and (2) WPP30 or WPP20 products, when used and only when used together in the same system, infringed claims 1-20 of the '676 Patent; its WPP30 and WPP20, when used with a connected device, infringed claims 1-5, 7-8, and 19 of the '237 Patent; its (1) MeetingBar A20 and (2) WPP30 or WPP20, when and only when used together in the same system, infringed claims 1-15 and 17-21 of the '951 Patent; its (1) MeetingBoard and (2) WPP30 or WPP20, when and only when used together in the same system, infringed claims 1-15 and 17-21 of the '951 Patent; and its (1) RoomCast and (2) WPP30 or WPP20, when and only when used together in the same system, infringed claims 1-15 and 17-21 of the '951 Patent;. ECF 85, Third Amended Answer, ¶¶41, 51, 61, 71, 81, 91. When Yealink sells these products, sometimes they are sold as stand-alone products, sometimes they are sold as part of a package of multiple products. YEALINK_00012755.

9. On May 17, 2023, Barco notified Yealink of its infringement of the '002, '832, and '952 Patents. BARCO_0000001-BARCO_0000041.

10. On August 23, 2023, Barco further notified Yealink of its infringement of the '103 and '237 Patents. BARCO_0052328

11. On November 14, 2023, Barco filed a complaint against Yealink in the Eastern District of Texas alleging infringement of the Asserted Patents. ECF 1, Complaint.

12. On March 18, 2024, Yealink answered the complaint, in which it denied infringing any claim of the Asserted Patents. ECF 19, Answer

13. On April 25, 2024 Yealink issued the following press release to its US customers and distributors:

[redacted] – [redacted]

Yealink End-of-Sale Announcement of WPP20/WPP30 in the United States Market

Dear Customers,

We hereby announce that Yealink will no longer sell WPP20/WPP30 products as standalone devices or in combination with corresponding video conferencing systems into the United States market. Yealink remains committed to providing the WPP20/WPP30 products to other regions around the world. Sales outside of the United States will continue unaffected. We will further continue to support Yealink products according to our product life cycle policy, which can be found at this link: Yealink's Product Life Cycle Policy.

Yealink remains committed to providing excellent products and services to our global customers. Thank you for your continued trust in Yealink.

Notification Date: April 25, 2024
Effective Date: April 25, 2024

Yealink Network Technology Co., Ltd.
All rights reserved.

Yealink Product Recall Notice of WPP20/WPP30 for the US market

Dear Yealink Distributors in the US,

Yealink requests your immediate attention regarding the Yealink WPP20 and WPP30 products in your inventory. Effective immediately, we kindly request that you recall all WPP20 and WPP30 products in your inventory, and send all such products back to Yealink. Yealink's logistics team will be available to assist.

This recall is related to Yealink's decision to cease all sales of its WPP20 and WPP30 products in the United States effective April 25, 2024. For more information, please refer to Yealink's announcement on its official website (https://www.yealink.com/en/product-detail/wireless_presentation_wpp30_eol).

We thank you for your understanding and cooperation. If you have any questions, please call your local Yealink sales representative.

Sincerely,

Yealink Network Technology Co., Ltd.
All rights reserved.

BARCO_0052475

14. On September 20, 2024, Yealink filed a Second Amended Answer, in which it admitted to infringement of claim 11 of the '002 Patent and claim 1 of the '832, '103, '676, '237, and '951 Patents. ECF 47, Second Amended Answer.

[redacted] – [redacted]

15. On March 12, 2025, Yealink filed a Third Amended Answer, in which it admitted each of the below listed Accused Instrumentalities infringes the Asserted Claims as listed in the chart below:

Patent Number	Infringed Asserted Claims	Accused Instrumentality
U.S. Patent No. 10,762,002	1-7 and 10	WPP20 or WPP30 with connected device.[1]
U.S. Patent No. 10,795,832	1-4, 6-8, 13-14, and 16-19	WPP30 and WPP20
U.S. Patent No. 10,904,103	1-2, 16-17, and 19-20	WPP30 and WPP20
U.S. Patent No. 11,258,676	1-20	WPP30 and WPP20 with MeetingBar or MeetingBoard
U.S. Patent No. 11,403,237	1-5, 7-8, and 19	WPP20 or WPP30 with connected device.
U.S. Patent No. 11,422,951	1-15 and 17-21	WPP30 and WPP20 with MeetingBar, MeetingBoard, or RoomCast.

ECF 85, Third Amended Answer.

[1] I understand a "connected device" as any device compatible with the WPP20 and WPP30. The WPP20 is compatible with Yealink's VC200, VC210, VC500, VC800, VC880, VP59-VCS Edition, MeetingEye 400, MeetingEye 400 Pro, MeetingEye 600, MeetingEye 800, MeetingBoard 65, MeetingBoard 86, RoomCast, MeetingBar A10, MeetingBar A20, MeetingBar A30, MShare, and MTouch II, and the WPP30 is compatible with MeetingEye 400, MeetingEye 400 Pro, MeetingEye 600, MeetingEye 800, MeetingEye 500, MeetingEye 900, MeetingBoard 65, MeetingBoard 86, RoomCast, MeetingBar A10, MeetingBar A20, MeetingBar A30, MeetingBar A40, MTouch Plus, and MTouch E2. Defs.' 1st Suppl. and Am. Resp. to Pls.' 4th Set of Interrog. No. 19 (April 18, 2025); BARCO_0067547-BARCO_0067553.

[redacted] – [redacted]

16. I understand that despite Yealink's April 25, 2024 press release and September 20, 2024 and March 12, 2025 admissions of infringement, Yealink's Connected Devices, including the MeetingBar, MeetingBoard, and RoomCast continue to support the infringing use of WPP20 and WPP30 products within the United States. Cai Dep., 56:18-57:13, April 13, 2025.

17. I have been asked to review certain materials and provide my opinions regarding the matters discussed herein. The facts and opinions set forth in this Report are based on my own personal knowledge, observations, and information available to me at the time of this Report.

18. I have made every effort to accurately and completely investigate and opine on the relevant areas described herein. Where applicable, the findings presented are made to a reasonable degree of scientific certainty. I reserve the right to supplement this report if new information becomes available after this report is signed, including but not limited to, additional discovery or documents, opinions of the court, or the opinions or testimony of other experts. I reserve the right to respond to any opinions offered by other experts and to any testimony offered at trial. Additionally, I reserve the right to create graphics or demonstratives to support my opinions and aid the court if I am called to testify.

IV. SUMMARY OF OPINIONS

19. Barco sells Tools in the United States, and that Barco's Clickshare products practice claims of each Asserted Patents. *See e.g.*, Appendix B.

20. Crestron's AirMedia Receiver AM-3200-WF Receiver and AM-TX-100 Adaptor products practice claims of the Asserted Patent. *See e.g.*, Section XII.

21. I agree that the Accused Instrumentalities practice claims of the Asserted Patents. *See. E.g.,* Appendix B.

22. In my opinion, the proposed non-infringing alternatives are inadequate solutions and would not be considered acceptable substitutes for products that perform aspects of the

[redacted] – [redacted]

Asserted Patents because the non-infringing alternatives do not offer a system as simple, secure, and agnostic as the Asserted Patents.

[redacted]

24. In my opinion, Yealink intentionally supports the continued use of the WPP20 and WPP30 products in the United States even after the End-Of-Sale Announcement and Recall Notice. In my opinion, Yealink could release and push out a firmware update that would cease to support the ongoing use of the WPP20 and WPP30 products in conjunction with the above identified connected device, including the MeetingBar A20, MeetingBoard, and RoomCast in the United States. *See e.g.*, Section XI below.

25. In my opinion, despite Yealink's April 25, 2024 press release and September 20, 2024 and March 12, 2025 admissions of infringement, Yealink's connected devices, including the MeetingBar, MeetingBoard, and RoomCast continue to support the infringing use of WPP20 and WPP30 products within the United States.

V. RELEVANT LEGAL STANDARDS

A. Infringement

26. I am not an attorney. I have been informed, for purposes of this report and other matters where I have been an expert witness, about certain aspects of the law, including patent law, that are relevant to my analysis and opinion.

27. I understand that a party directly infringes a patent claim when the party "makes, uses, offers to sell, or sells any patented invention within the United States or imports into the United States any patented invention during the term of the patent therefor[.]" *See* 35 U.S.C. § 271(a). I understand that whoever actively induces direct infringement of a patent shall be liable

as an infringer. *See* 35 U.S.C. § 271(b). I further understand that whoever "offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use, shall be liable as a contributory infringer." 35 U.S.C. § 271(c). Inducement and contributory infringement are sometimes referred to as "indirect" infringement.

28. I understand that to determine infringement of a patent claim, the accused instrumentality must be compared to the patent claim. A patent claim is literally infringed only if the accused instrumentality includes each and every element of the patent claim.

29. I understand that a directly infringing "use" of a system-type patent claim can occur when a party puts the invention into service, i.e., controls the system as a whole and obtains benefit from it, and exercises physical or direct control over each individual element of the system.

30. I understand that an accused method directly infringes a method-type patent claim when the accused method performs each and every step of the claimed method.

31. I understand that the process for determining direct infringement has two steps: first the terms of the claims are construed; then the accused instrumentality is compared to the properly construed claim.

B. Claim Construction

32. In determining herein whether the Accused Products possess the elements of the Asserted Claims, I have applied the claim construction below from the Court's claim construction Memorandum and Order (ECF 89).

[redacted] – [redacted]

Dispute Term	The Court's Construction
"means for audio communication" ('002 Patent, Claim 1)	Governed by 35 U.S.C. § 112 ¶ 6 **Function:** Provide audio communication between the peripheral device and the processing device **Structure:** "an interface using a generic communications protocol"
"means for data communication" ('002 Patent, Claim 1)	Governed by 35 U.S.C. § 112 ¶ 6 **Function:** Provide data communication between the peripheral device and the processing device **Structure:** "an interface using a generic communications protocol"
"means for communication" ('676 Patent, Claim 1)	Governed by 35 U.S.C. § 112 ¶ 6 **Function:** Provide communication between the peripheral device and the processing device **Structure:** "an interface using a generic communications protocol"
"the at least one peripheral device" ('103 Patent, Claims 1, 16)	"the computer peripheral device"

C. Invalidity

33. I understand that under 35 U.S.C. § 282, a patent is presumed valid. I also understand that the burden of establishing invalidity of a patent or any claim of a patent shall rest on the party asserting such invalidity.

34. At this stage, I have not seen any indication that the claims are invalid. In fact, in reviewing the Court's claim construction Memorandum and Order (ECF 89), the court rejected Yealink's allegation that certain claims of the Asserted Patents were invalid.

[redacted] – [redacted]

35. If opinions about the invalidity of the Asserted Patents are advanced, I reserve the right to respond to those opinions.

VI. OVERVIEW OF BARCO SAMPLE PRODUCTS

36. I was provided with a sample Barco Clickshare CX-30 and two ClickShare Buttons (together an exemplary "Barco System") to review, study and test. I received the ClickShare CX-30 in the box below:

BARCO_0067472. The label of the box indicates that "[t]his product is covered by patents and/or pending applications. For more info: https://www.barco.com/about-barco/legal/patents" which, is a link to a website with downloadable lists of Barco's Products "covered by patents or patent applications under 35 U.S.C. §287(a)." The same language is found in some of Barco's User manuals and materials. *See e.g.*, BARCO_0052683.

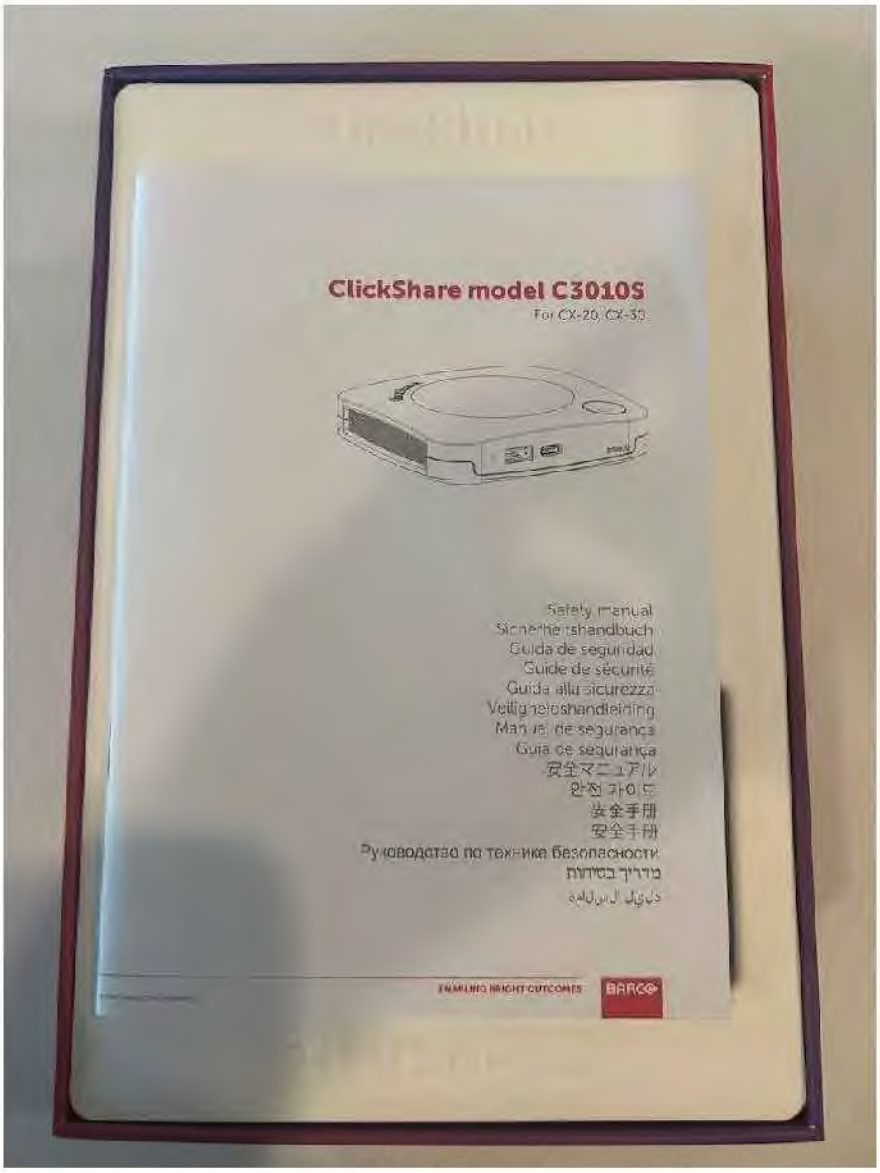
37. After surveying Barco's website, I understand that Barco's ClickShare line also includes the ClickShare C-5, C-10, CX-20, CX-50, CX-50 Gen 2, CB Core, and CB Pro products which are also designed to communicate with a ClickShare Button in substantially the same way as the CX-30. I further confirmed this fact by interviewing Wesley Lightcap, the United States Director of Sales for the ClickShare Technology and Erwin Six, the ClickShare Technology and

[redacted] – [redacted]

Innovation Direct at Barco. I have also reviewed the transcript of Wesley Lightcap from April 23, 2025 and the transcript of Erwin Six's deposition on April 25, 2025.

38. The contents of the package included a ClickShare CX-30, two ClickShare Buttons, and additional accessories and documentation.

39. The documentation included a product manual, for both the ClickShare CX-20 and ClickShare CX-30:



BARCO_0067473.

[redacted] – [redacted]

40. The image below shows the two ClickShare Buttons I received with the ClickShare CX-30:

BARCO_0067474.

41. The image below shows the bottom of the Clickshare CX-30 with associated labeling:

[redacted] – [redacted]

BARCO_0067476.

42. As shown in the ClickShare CX-30 installation manual, the front and back of the CX-30 include multiple ports:

[redacted] – [redacted]

Image 2–1 Front view of the CX-30 Gen2

1 Reset button
2 USB-A port
3 USB-C™ port
4 Power button

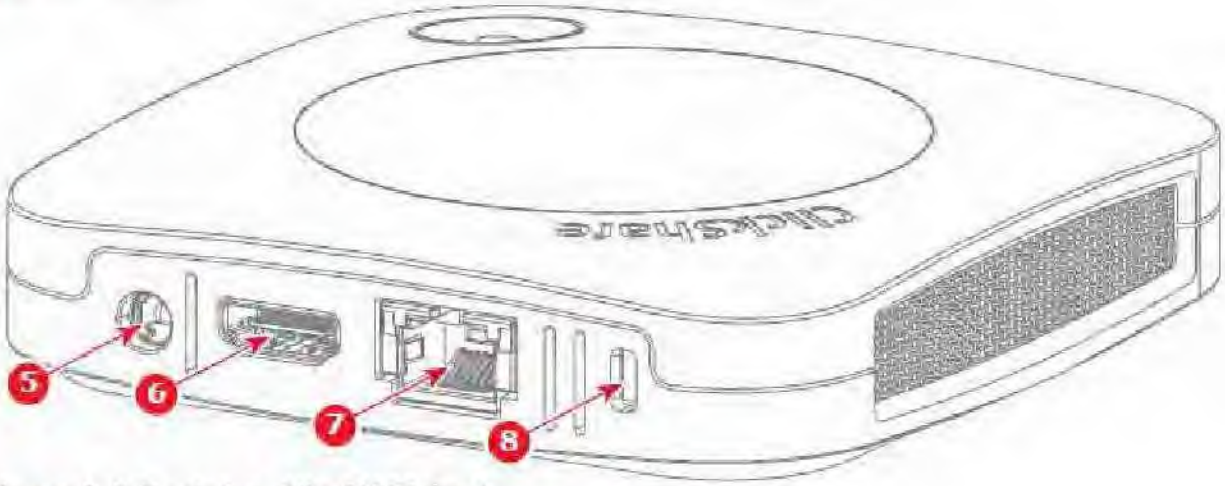


Image 2–2 Front view of the CX-30 Gen2

5 Power adapter port
6 HDMI™ out port
7 LAN port
8 Kensington™ lock

BARCO_0052694.

43. The image below shows the Power Supply Module for the ClickShare CX-30:

[redacted] – [redacted]

BARCO_0067478.

VII. OVERVIEW OF CRESTRON SAMPLE PRODUCTS

44. I was provided with a sample Crestron Crestron's AirMedia AM-3200-WF Receiver ("Receiver") and two AM-TX-100 Adaptor ("Adapter") (together an exemplary "Crestron System") to review, study and test. I received the Crestron System in the boxes depicted below:

[redacted] – [redacted]

BARCO_0067479.

45. I understand that Crestron's AirMedia line also includes the AirMedia Receiver AM-3100-WF and AirMedia Receiver AM-3000-WF products which are also designed to communicate with an AM-TX-100 Adaptor in substantially the same way as the AirMedia Receiver AM-3100-WF.

46. The contents of the packages included a Receiver, two Adaptors, an Adaptor holder, and additional accessories and documentation.

BARCO_0067480.

47. The image below shows the bottom side of the two Adapters I received:

[redacted] – [redacted]

BARCO_0067481.

48. The image below shows the bottom of the Receiver with associated labeling:

[redacted] – [redacted]

BARCO_0067482.

49. The image below shows the front and back of the Receiver:

[redacted] – [redacted]

BARCO_0067483.

BARCO_0067484.

VIII. OVERVIEW OF YEALINK SAMPLE PRODUCTS OF THE ACCUSED INSTRUMENTALITY

50. I was provided with samples of the Accused Instrumentalities, including the Yealink RoomCast, MeetingBar A20 with Touch Panel, and a WPP30 to review, study and test. For the purposes of this analysis, I refer to use of the WPP30 in communication with the Yealink RoomCast or MeetingBar A20 as the "Yealink System." To the extent the performance or functionality differs for the RoomCast or MeetingBar A20, I identify those models by name.

51. I personally set up and used the sample beginning on March 20, 2025. I describe my use of the sample below, confirming Yealink's admission that the WPP20 and WPP30 products contain each element of the Asserted Claims in this Action.

[redacted] – [redacted]

52. Below is an image of the WPP30[2], its box, and the WPP30's documentation:

BARCO_0067485.

[2] While I have only tested the WPP30, I understand that Yealink's admission of infringement does not parse any differences between the two products.

[redacted] – [redacted]

53. Yealink admits that its MeetingEye 400, MeetingEye 400 Pro, MeetingEye 600, MeetingEye 800, MeetingEye 500, MeetingEye 900, MeetingBoard 65, MeetingBoard 86, RoomCast, MeetingBar A10, MeetingBar A20, MeetingBar A30, MeetingBar A40, MTouch Plus, and MTouch E2 are also designed to communicate with the WPP30 in substantially the same way. Defs.' 1st Suppl. and Am. Resp. to Pls.' 4th Set of Interrog. No. 19 (April 18, 2025); *see also* BARCO_0067547-BARCO_0067553.

54. Yealink admits that its VC200, VC210, VC500, VC800, VC880, VP59-VCS Edition, MeetingEye 400, MeetingEye 400 Pro, MeetingEye 600, MeetingEye 800, MeetingBoard 65, MeetingBoard 86, RoomCast, MeetingBar A10, MeetingBar A20, MeetingBar A30, MShare, and MTouch II are also designed to communicate with the WPP20. Defs.' 1st Suppl. and Am. Resp. to Pls.' 4th Set of Interrog. No. 19 (April 18, 2025); *see also* BARCO_0067547-BARCO_0067553.

55. I understand Yealink admits each of the Sample Yealink Products infringe the Asserted Claims of the Asserted Patents as identified in Section III.

56. As set forth below, I agree with Yealink's admissions that its Sample Products of the Accused Instrumentality infringe the Asserted Claims of the Asserted Patents.

A. Overview of Yealink RoomCast

57. The image below shows the RoomCast in the box below:

[redacted] – [redacted]

BARCO_0067486.

BARCO_0067487.

58. The box included a RoomCast, documentation, and various accessories including a Power Supply Module, and HDMI cable.

[redacted] – [redacted]

59. The documentation included a product manual:

BARCO_0067488.

60. The images below show the front and bottom of the RoomCast with associated labeling:

BARCO_0067489.

BARCO_0067490.

B. Overview of Yealink Meeting Bar

61. Below are front, back, and bottom image of the MeetingBar A20 with associated labeling:

BARCO_0067497.

BARCO_0067498.

[redacted] – [redacted]

62. Below is an image of the multiple accessories that come with the MeetingBar A20, including a Power Adapter, and HDMI cable:

BARCO_0067499.

IX. OVERVIEW OF MICROSOFT WINDOWS 11 TEST MACHINE

63. In preparing this report I tested the Sample Products with a Lenovo IdeaPad 3 laptop computer ("Test Machine"), running Microsoft Windows 11 operation system, version 22H2. The Test Machine includes an Intel Core i3-10110U CPU @ 2.10GHz 2.59GHz, with 8.00 GB of installed RAM.

64. Images of the Test Machine are depicted below:

[redacted] – [redacted]

BARCO_0067500.

BARCO_0067501.

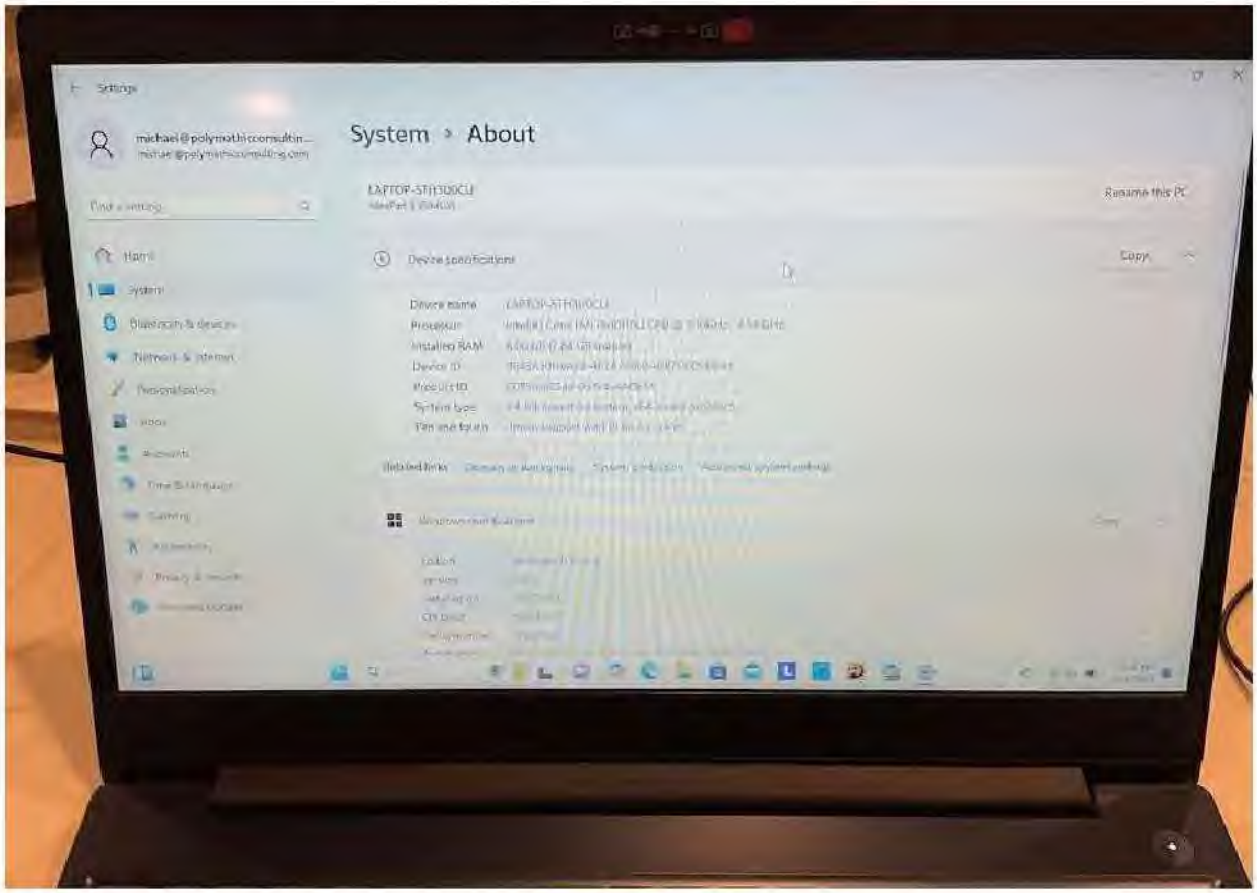
[redacted]

BARCO_0067502.

BARCO_0067503.

65. An image showing the system details of the Test Machine are shown below:

[redacted] – [redacted]



BARCO_0067504.

66. In addition to testing with the Test Machine, I also tested the Sample Products with a Apple Macbook Air, running macOS Sonoma 14.7.2, including an Apple M2 processor and 8GB of installed RAM. I found the product to function in substantially same way with the Macbook Air.

67. Likewise, I also tested the Sample Products using a USB-A port and a USB-C port. I found the products to function in substantially the same way irrespective of the port used.

X. THE PATENTED TOOLS FOR COLLABORATION

68. The Asserted Patents are directed to Barco's patented Tools for Collaboration that are embodied in the claim in the Asserted Patents. *See e.g.*, the '002 Patent at 1:14; the '832 Patent at 1:22; the '103 Patent at 1:29; the '676 Patent at 1:30; the '237 Patent at 1:24; the '951 Patent at

[redacted] – [redacted]

1:24. It is my opinion that the Barco and Yealink Sample Products discussed above each utilized the claimed elements of these Tools. Indeed, these features are emphasized in Barco and Yealink's marketing materials.

69. I understand that Yealink has identified HDMI's standard license as comparable, and it is my opinion that the wired technology of HDMI is not technically comparable to the wireless solution of Barco's Asserted Patents. *See, e.g.*, YEALINK_00011316-00011325.

70. It is my opinion Barco's Tools have a recognized technical value, which is evidenced by how Barco, and Yealink market their products. My opinion is supported by my discussion with Erwin Six on April 24, 2025; and the depositions [redacted] on April 18, 2025 and Dunxiong Cai on April 13, 2025.

71. Key claimed aspects of the Asserted Patents describe Tools or the use of these Tools including a Dongle Tool (as claimed by the Asserted Patents including the '832 Patent), a Base Unit (as claimed by the Asserted Patents including the '951 Patent), an Indicator (as claimed by the Asserted Patents including the '103 Patent), Audio and Display Data Communication (as claimed by the Asserted Patents including the '237 Patent), use of Preinstalled Generic Drivers (as claimed by the Asserted Patents including the '002 Patent) and use of a Portable Application (as claimed by the Asserted Patents including the '676 Patent).

72. In the Section IX, I describe the key aspects of these example Tools in more detail with respect to each of the Asserted Patents, the Barco System and the Yealink System.

XI. BENEFITS OF BARCO'S TOOLS FOR COLLABORATION

73. Collaboration, problem solving, negotiations, teaching, and education all benefit from allowing ad hoc groups of people to communicate with each other. The '002 Patent, 1:15-18. Prior to the Asserted Patents, then-existing electronic communications tools included synchronous and asynchronous conferencing, online chat, instant messaging, audio conferencing,

videoconferencing, data conferencing, application sharing, remote desktop sharing, electronic meeting systems, collaboration management (coordination) tools, project management systems, knowledge management systems, and social software systems. *Id.*, 1:19-27.

74. Collaborative workspaces offered geographically distributed collaborators a virtual repository for documents related to a project or a meeting. *Id.*, 1:41-44. The availability of electronic meeting systems (e.g., interactive network-connected white boards and videoconferencing applications) benefited those who shared the same room as well as those in remote locations. *Id.*, 1:44-48.

75. However, users often experienced certain problems in meetings. For example, if two participants wanted to present two different presentations at the same meeting, then both presentations needed to be placed on one machine or the participants needed a way to swap between presenters' machines. *Id.*, 2:66-3:3. To address this, participants would rely on cables connected to a projector or a remote desktop software which captures content and sends it over a wired or wireless network to a base station connected to a projector. *Id.*, 3:3-11. Less commonly, users would rely on special devices connected to display adapter that would capture, encode, and stream the display content over a wired or wireless network. *Id.*, 3:12-15.

76. However, these methods also presented their own problems. For example, hardwired connections lack scalability and require a cumbersome process of connecting different devices (including different PC formats) to the projector with a number of different adapters (e.g., VGA, DVI, DP, HDMI). *Id.*, 3:15-35. Additionally, utilizing cables is limited by the reach of the cable and may also result in a disorganized appearance in the meeting room. *Id.*, 3:35-42. It may be time consuming to match the display resolution and refresh rate of the computer and the display or projector. *Id.*, 3:44:46.

[redacted] – [redacted]

77. Use of a remote desktop application also has disadvantages. For example, if the connection is made to a corporate LAN, there is a danger of viruses, malware, or spyware transferring in either direction, as well as a risk of confidential information being copied. *Id.*, 3:47-50. Further, there may be difficult in making the connection between the devices. *Id.*, 3:50-53. These systems may also require specific software drivers to be installed on the PC to allow for audio communication. *Id.*, 4:30-35.

78. Display adapters exhibit many of the same problems as a cabled connection but may also require a special device with significant processing power which would require a relatively large and expensive device. *Id.*, 3:60-64.

79. Another alternative was connecting to a room system by plugging into USB devices. *Id.*, 3:65-4:10. However, this solution often required special drivers and even special hardware. *Id.*, 4:5-9.

80. Another consideration for each of these options is the relevant firewalls that may be in place. Typically, a visitor to a meeting will have a laptop that is set up for a different corporate networking environment, so it has different or incompatible networking settings. *Id.*, 4:11-15. These firewalls may block telecommunication software. *Id.*, 4:15-17. To navigate these issues may require adjusting a computer's setting or seeking assistance from IT support which waste valuable time. *Id.*, 4:26-29.

81. The inventors of the Asserted Patents recognized the need to provide a single technology solution to address these issues. *Id.*, 4:61-62. In my opinion the Tools of the Asserted Patents provides a user with a simple, secure, and agnostic solution to enable wireless presentation and collaboration.

[redacted] – [redacted]

XII. PROPOSED NON-INFRINGING ALTERNATIVES

82. I understand Yealink alleged there are a number of non-infringing alternatives. In its Responses to Interrogatories, Yealink stated that the non-infringing alternatives include:

> at least other methods for connecting a personal, or peripheral, device such as a computer or a laptop to a base unit, including wired connections, and other wireless connections including connections through protocols such as AirPlay, MiraCast, SmartShare, Screen Mirroring, and SmartView. Yealink further identifies meeting platforms such as Microsoft Teams, Zoom, Cisco WebEx, and Google Meet provide the capability for a user to connect a personal, or peripheral device and wirelessly share contents from that device.

Defs.' 1st Suppl. and Am. Resp. to Pls.' 2nd Set of Interrog. No. 13 (April 18, 2025).

83. In my opinion, these non-infringing alternatives are inadequate solutions and would not be considered acceptable substitutes for products that perform aspects of the Asserted Patents. This opinion is based on my own personal opinions, conversations with Erwin Six and Wesley Lightcap, and review of the deposition transcripts of Erwin Six, Wesely Lightcap, [redacted] 100:8-9, April 18, 2025 ("There's some customers that like the convenience of the wireless and the dongle."); Lightcap Dep., (Rough)[3] 26:21-29:13, April 23, 2025 (explaining that "the three main advantages of ClickShare over competitors" is that "ClickShare is simple, secure, and agnostic."); Six Dep., (Rough) 187:3-5, 187:22-188:1, 189:13-19, April 25, 2025 ("From our users who have the app, [redacted]) ("We don't know all the details everywhere, but we know that the value of the button

[3] I reserve the right to supplement this report when the final transcripts from the depositions of Wesley Lightcap and Erwin Six become available.

[redacted] – [redacted]

is extremely high and that it is uncomparable to any others, like an app based solution.") ("The customer wants extreme simplicity. The IT manager wants super security. The people want to have it work equally on their windows laptop as on their Apple MacIntosh Mac laptop. So all these factors make the app and the button are two different experiences."); BARCO_0067568.

84. A wired connection is not an acceptable non-infringing alternative. Issues with a wired connection are identified in the background of the Asserted Patents. *E.g.*, the '002 Patent, 3:15-46.

85. Protocols such as AirPlay, MiraCast, SmartShare, Screen Mirroring, and SmartView are not acceptable non-infringing alternatives. These protocols require the sharing device (e.g., the computer, laptop, tablet, or mobile device) to connect to or share a wireless network with the displaying device (e.g., a computing device, monitor, or television). I also understand that certain Barco and Crestron products, like, for example, the Barco Clickshare CX-30 and the Crestron AM-3200-WF Receiver are capable of at least one of these protocols and even provide their own app based solutions, but wireless presenting and conferencing in accordance with the Asserted Patents is still desired by users. [redacted] 100:8-9, April 18, 2025 ("There's some customers that like the convenience of the wireless and the dongle."); Lightcap Dep., (Rough) 26:21-29:13, April 23, 2025 (explaining that "the three main advantages of ClickShare over competitors" is that "ClickShare is simple, secure, and agnostic."); Six Dep., (Rough) 187:3-5, 187:22-188:1, 189:13-19, April 25, 2025 ("From our users who have the app, [redacted]) ("We don't know all the details everywhere, but we know that the value of the button is extremely high and that it is uncomparable to any others, like an app based solution.") ("The customer wants extreme simplicity. The IT manager wants super security. The people want to have it work equally on their windows laptop as on their Apple

MacIntosh Mac laptop. So all these factors make the app and the button are two different experiences."); BARCO_0067568.

86. Meeting platforms such as Microsoft Teams, Zoom, Cisco WebEx, and Google Meet are also not acceptable non-infringing alternatives. These platforms require the sharing device (e.g., the computer, laptop, tablet, or mobile device) to communicate over an internet connection. I also understand that both certain Barco and Crestron products, like, for example, the Barco Clickshare CX-30 and the Crestron AM-3200-WF Receiver, when connected with appropriate peripheral devices (e.g., a video bar, microphone, speaker, or webcam) are capable of participating in calls on these platforms. However, wireless presenting and conferencing in accordance with the Asserted Patents is still sought by users. [redacted] 100:8-9, April 18, 2025 ("There's some customers that like the convenience of the wireless and the dongle."); Lightcap Dep., (Rough) 26:21-29:13, April 23, 2025 (explaining that "the three main advantages of ClickShare over competitors" is that "ClickShare is simple, secure, and agnostic."); Six Dep., (Rough) 187:3-5, 187:22-188:1, 189:13-19, April 25, 2025 ("From our users who have the app, [redacted]) ("We don't know all the details everywhere, but we know that the value of the button is extremely high and that it is uncomparable to any others, like an app based solution.") ("The customer wants extreme simplicity. The IT manager wants super security. The people want to have it work equally on their windows laptop as on their Apple MacIntosh Mac laptop. So all these factors make the app and the button are two different experiences."); BARCO_0067568.

XIII. SAMPLE PRODUCTS OF BARCO'S TOOLS FOR COLLABORATION

87. I have provided a summary below of various features that appear in Barco's Tools and have provided relation to certain patents. This identification of patents is not a limitation on my opinions as these same limitations and features appear in multiple of the Asserted Patents. I

[redacted] – [redacted]

have endeavored to identify the Asserted Claims in which such Tools and features appear but note that this may not be an exhaustive list.

Feature	**Patent/Claims**
Dongle (Section X.A)	The '832 Patent, claims 1-4, 6-8 The '103 Patent, claim 2 The '676 Patent, claims 4, 6 The '951 Patent, claim 4
Base Unit (Section X.B)	The '676 Patent, claim 2 The '951 Patent, claims 1-2, 8-10, 15, 17, 21
Visual Indicator (Section X.C)	The '832 Patent, claims 18-19 The '103 Patent, claim 1 The '951 Patent, claim 14
Audio and Display Data (Section X.D)	The '103 Patent, claim 16 The '237 Patent, claims 1, 19 The '951 Patent, claim 20
Preinstalled Generic Driver (Section X.E)	The '002 Patent, claims 1-4 The '676 Patent, claims 5, 13 The '237 Patent, claim 3 The '951 Patent, claim 5
Portable Application (Section X.F)	The '002 Patent, claims 5-6 The '832 Patent, claims 13-14, 16-17 The '103 Patent, claims 17, 19-20

	The '676 Patent, claims, 1, 7 The '237 Patent, claim 5 The '951 Patent, claims 3, 18

A. The Dongle Tool

88. A key aspect of Barco's Tools is the *Dongle Tool*. For example, the '832 Patent (among other Asserted Patents) claims key features required to be a Dongle Tool.

89. As set forth in Appendix B, it is my opinion that the Barco System practices at least claim 1 of the '832 Patent, which contain elements directed to a Dongle Tool.

90. Yealink has admitted the Yealink Systems infringed claims 1-4, 6-8, 13-14, and 16-19 of the '832 Patent. ECF 85, Third Amended Answer, ¶51.

91. Based on my review, I agree with Yealink's admissions, and it is my opinion the Yealink Systems contain the advantages of the Dongle Tool.

92. Claim 1 of the '832 Patent claims certain key technical elements required for implementing a Dongle Tool:

1. *A peripheral device comprising:*

a base,

a connector configured to connect to a serial plug and play port of a host processing device,

a flexible connection between the base and the connector configured to transfer data signals and power, and

wherein the base has electronic comprising a wireless transceiver and a processing engine, wherein said wireless transceiver and the processing engine are

[redacted] – [redacted]

configured to connect the peripheral device directly to a wireless communications network, and,

a physical actuator on the base being configured to actuate a signal and to transfer the signal to the connector to transfer to the serial plug and play port via at least one pre-installed generic driver for the port, and the serial plug and play port is configured to receive thereafter image data displayed on the host processing device;

wherein the physical actuator is configured to be activated by a user action applied to the physical actuator which triggers delivery of the image data form the host processing device via the serial plug and play port to the wireless transceiver, and from the wireless transceiver to the wireless communications network.

93. As required by claim 1 above, the Dongle Tool is a peripheral device which includes a base housing a transmitter and processing engine, a serial connector, a flexible connection, and a physical actuator that is able to receive data transferred from a computer in a manner independent of the computer operating system and does not require installation of drivers or applications on the computer. The '832 Patent at 21:28-35.

94. An example Dongle Tool is depicted in Fig. 4 below:

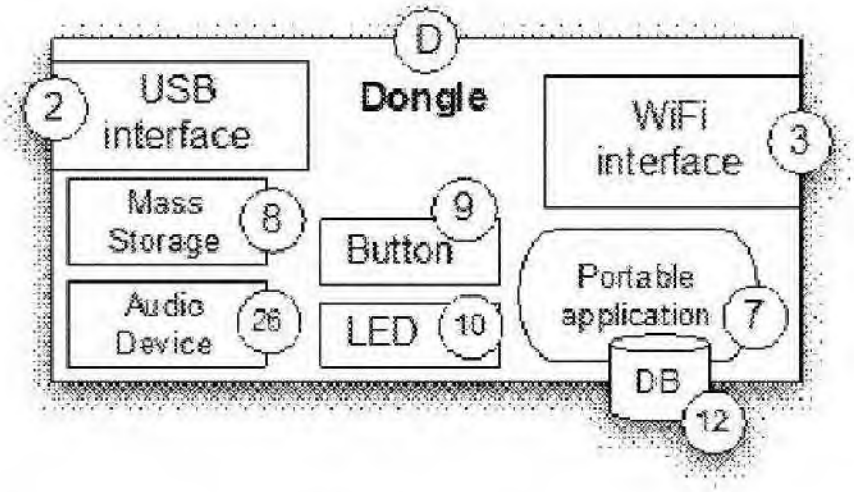


Fig. 4

The '832 Patent at Fig. 4.

95. The '832 Patent also provides an example of the dongle in Fig. 10:

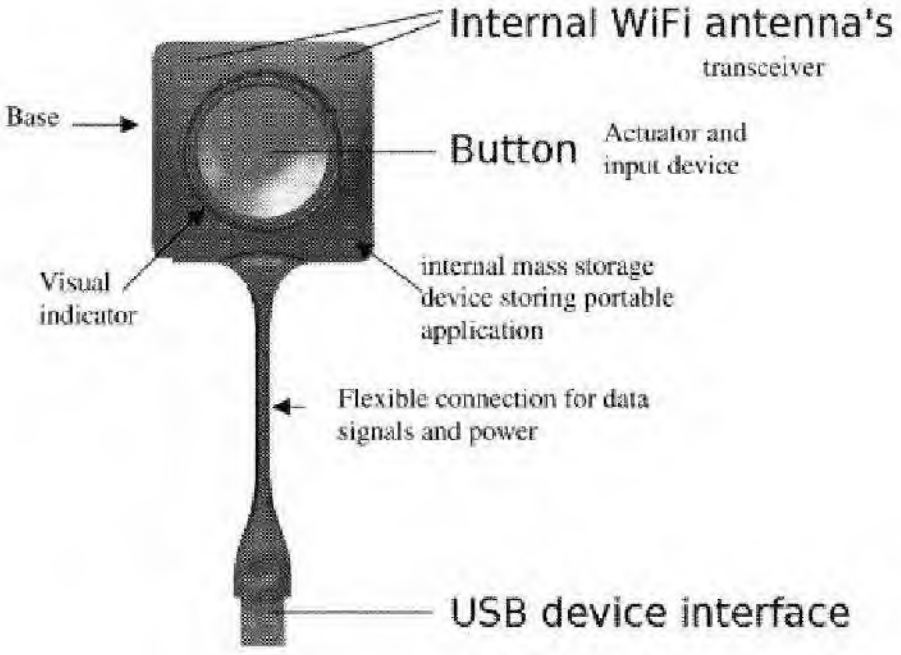


Fig. 10

The '832 Patent Fig. 10.

[redacted] – [redacted]

96. Once the peripheral device is connected to a computer, the user may wirelessly share content to a display connected to a base node by pressing the button of the Dongle Tool, which acts as a toggle. The '832 Patent at 22:39-51.

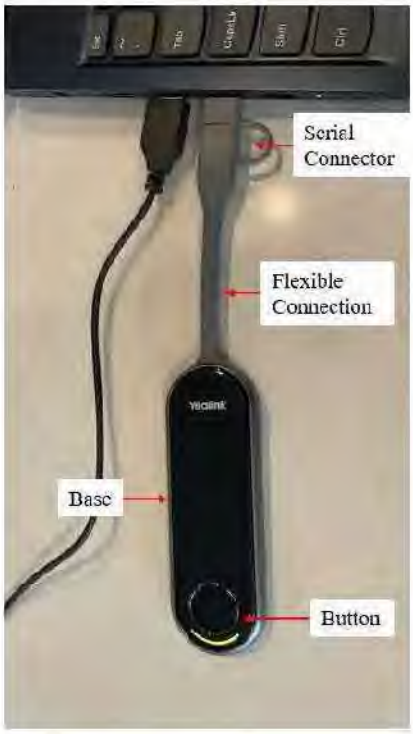
97. It is my opinion that the Barco System and Yealink System include the technical elements to be a "Dongle Tool" I have identified in claim 1 of the '832 Patent.

98. Both Barco and Yealink advertise the important features of the Dongle Tool.

Barco System	Yealink System
 **Plug in and go with the ClickShare Button** With the ClickShare Button you start your wireless video meeting or share content on the meeting room display. Plug the USB-C device into your laptop and within seconds, you are automatically connected to the meeting room equipment. Even guests can join this way! Or enjoy the full ClickShare experience and get access to advanced benefits with the free Desktop or Mobile Apps. BARCO_0066433.	 YEALINK_00002086.

99. I have annotated the Barco ClickShare Button, the Yealink WPP30 in the table below to identify visible aspects of the Dongle Tool such as the serial connector, the flexible connection, the base, and the button:

[redacted] – [redacted]

Barco System	Yealink System
	
BARCO_0067536.	BARCO_0067524.

100. In my opinion, the ClickShare Button and WPP30 include a wireless transceiver and processing engine. For example, the ClickShare Button that is capable of wireless transmission compatible with WiFi (IEEE 802.11 a/b/g/n/ac), and encryption (WPA-PSK/WPA2-PSK). (BARCO_0066545).

101. The WPP30 also includes a wireless transceiver and processing engine. For example, the WPP30 datasheet discloses that the WPP30 is capable of wireless transmission compatible with WiFi (IEEE 802.11 a/b/g/n/ac), and encryption (WPA-PSK/WPA2-PSK). (YEALINK_00002084).

102. For further analysis of the Barco System with respect to claim 1 of the '832 Patent, please refer to Appendix B.

[redacted] – [redacted]

103. It is also my opinion that the Yealink System practices claim 1 of the '832 Patent, and Yealink has admitted the Yealink System infringes claims 1-4,6-8-13-14, and 16-19 of the '832 Patent.

B. The Base Unit

104. Another key aspect of the Tools is the *Base Unit*. For example, the '951 Patent (among other Asserted Patents) claims the features of the Base Unit.

105. As illustrated in Appendix B, it is my opinion that the Barco System practices at least claim 1 of the '951 Patent.

106. Yealink has admitted the Yealink Systems infringed claims 1-15 and 17-21 of the '951 Patent. ECF 85, Third Amended Answer, ¶91.

107. Based on my review, I agree with Yealink's admissions, and it is my opinion the Yealink Systems contain the advantages of the Base Unit.

108. Claim 1 of the '951 Patent claims, in part, a Base Unit:

1. An electronic meeting tool for communicating user selected arbitrary media content from users at a meeting comprising:

a base node, the base node being coupled to a first display, the base node being adapted to receive user selected arbitrary media content from at least one peripheral device via a wireless communications network, and to control display of the user selected arbitrary media content on the first display; and

the at least one peripheral device being adapted to communicate the user selected arbitrary media content to the wireless communications network;

wherein the at least one peripheral device is a connection unit comprising:

(a) a connector adapted to couple to a port of a user processing device, the user processing device having a second display and a memory,

(b) a transmitter for transferring user selected arbitrary media content to the wireless communications network, and

(c) an input device configured to allow the user to carry out a user action on the input device that triggers transfer of said user selected arbitrary media content from the transmitter to the wireless communications network and to the base node through the wireless communications network for display on the first display, the input device being a physical actuator coupled to the at least one peripheral device.

109. An example Base Unit is depicted in Fig. 3 below:

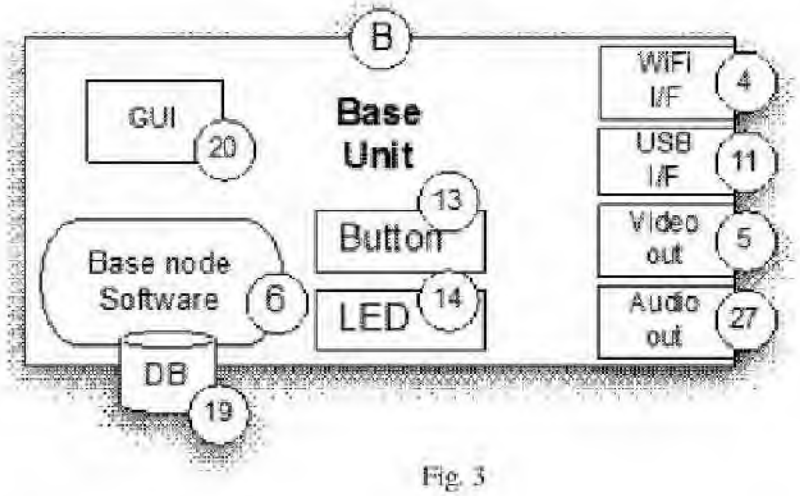


Fig. 3

The '951 Patent at Fig. 3.

110. The Base Unit receives the media from one or more Dongle Tools and auto composes the content on the display. The '951 Patent, 18:29-32.

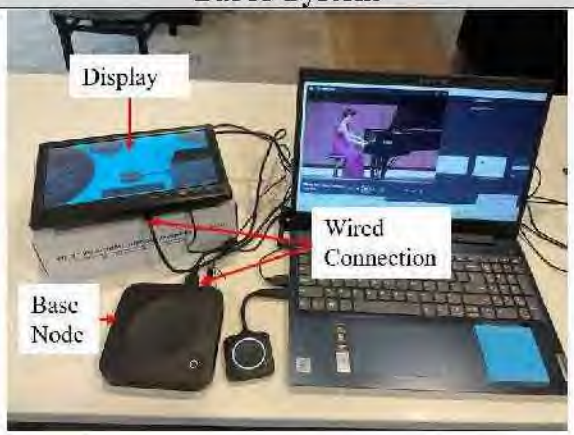
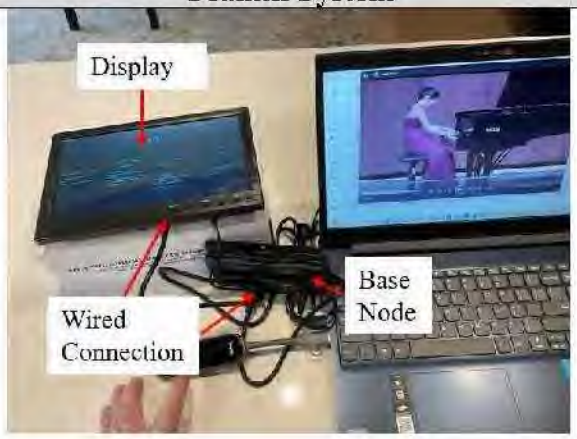
111. It is my opinion that each of the Barco System and Yealink System include the technical elements of the "Base Unit" I have identified in claim 1 of the '951 Patent.

112. Both Barco and Yealink advertise use of the Dongle Tool with a Base Unit:

[redacted] – [redacted]

Barco System	Yealink System
 BARCO_0066436.	 YEALINK_00002087.

113. I have annotated the ClickShare CX-30 and the Yealink RoomCast in the image below to show that it is configured to connect to a display:

Barco System	Yealink System
 BARCO_0067536.	 BARCO_0067539.

114. It is also my opinion that the CX-30 and RoomCast are adapted to receive media content from the corresponding Dongle Tools and control its display on the Monitor. For example,

[redacted] – [redacted]

as shown below, the CX-30 and RoomCast receive the media content from the Test Machine through the ClickShare Button and WPP30, as evidenced by the display showing the same content as the Test Machine:

Barco System	Yealink System
	
BARCO_0067538.	BARCO_0067540.

115. For further analysis of the Barco System with respect to claim 1 of the '951 Patent, please refer to Appendix B.

116. It is also my opinion that the Yealink System practices claim 1 of the '951 Patent, and Yealink has admitted the Yealink System infringes claims 1-15 and 17-21 of the '951 Patent.

C. The Visual Indicator

117. Another aspect of the Tools is the *Visual Indicator*. For example, the '103 Patent (among other Asserted Patents) claims the Visual Indicator.

118. As illustrated in Appendix B, it is my opinion that the Barco System practices claim 1 of the '103 Patent.

119. Yealink has admitted the Yealink Systems infringed claims 1-2, 16-17, and 19-20 of the '103 Patent. ECF 85, Third Amended Answer, ¶61.

[redacted] – [redacted]

120. Based on my review, I agree with Yealink's admissions, and it is my opinion the Yealink Systems contain the advantages of the Visual Indicator.

121. Claim 1 of the '103 Patent claims, in part, the Visual Indicator on the Dongle Tool:

1. A computer peripheral device comprising:

a base,

a connector for connection to a serial plug and play port of a host processing device,

a flexible connection between the base and the connector, a transceiver for communicating with a communications network,

a physical actuator on the base configured to allow user action to actuate the physical actuator to trigger transfer of a signal to the connector to transfer to the serial plug and play port via at least one pre-installed generic driver for the serial plug and play port, and the serial plug and play port being configured to receive arbitrary media content on the host processing device,

wherein the base has a visual indicator which is also activated by the user action applied to the physical actuator,

wherein the physical actuator is configured to be activated by the user action applied to the physical actuator to trigger delivery of the arbitrary media content on the host processing device to said transceiver on the computer peripheral device through said serial plug and play port, and from the transceiver to the communications network,

wherein the visual indicator is configured in a way such that the user action by actuating the physical actuator indicates to the user whether or not the

[redacted] – [redacted]

arbitrary media content is being sent from the at least one peripheral device to the communications network.

122. As required by claim 1 above, the Dongle Tool includes a Visual Indicator which indicates to a user whether or not content is being shared from the Dongle Tool. The Visual Indicator thus informs the user and other meeting participants when content is being shared to the base node for display. The '103 Patent, 22:46-49.

123. It is my opinion that each of the Barco System and Yealink System include a Visual Indicator as described in the '103 Patent.

124. Both Barco and Yealink advertise the Visual Indicator of the Dongle Tool:

Barco System	Yealink System
 **Step 3:** Wait till the LEDs of the Button are static white, and then click the Button to show your screen on the display. Click again to remove your screen from the display. BARCO_0048706	 YEALINK_00002086 LED System Error Indicator System Status Indicator YEALINK_00002089

125. I have annotated the ClickShare Button and WPP30 below to show the Visual Indicator:

[redacted] – [redacted]

Barco System	Yealink System
 BARCO_0067536.	 BARCO_0067524.

126. The visual indicator on the ClickShare Button and WPP30 also indicate whether or not arbitrary media content is being sent on the communications network. The image below depicts the Barco System and Yealink System when media content is not being shared from the Test Machine:

[redacted] – [redacted]

Barco System	Yealink System
	
BARCO_0067537.	BARCO_0067539.

127. Here, the ClickShare button is a white light, while the WPP30 shows a slowly flashing green light.

128. After I press the actuator of the ClickShare Button and WPP30 to share the screen from the Test Machine, the Visual Indicators change. As shown below, The Visual Indicator of the ClickShare Button is red, and the Visual Indicator of the WPP30 is solid green:

Barco System	Yealink System
	
BARCO_0067538.	BARCO_0067540.

[redacted] – [redacted]

129. For further analysis of the Barco System with respect to claim 1 of the '103 Patent, please refer to Appendix B.

130. It is also my opinion that the Yealink System practices claim 1 of the '103 Patent, and Yealink has admitted the Yealink System infringes claims 1-2, 16-17, and 19-20 of the '103 Patent.

D. Audio and Display Data Communication

131. Another key aspect of the Tools is Audio and Data Communication. For example, the '237 Patent (among other Asserted Patents) claims Audio and Data Communications.

132. As illustrated in Appendix B, it is my opinion that the Barco System practices claims 1 and 4 of the '237 Patent.

133. Yealink has admitted the Yealink Systems infringed claims 1-5, 7-8, and 19 of the '237 Patent. ECF 85, Third Amended Answer, ¶81.

134. Based on my review, I agree with Yealink's admissions, and it is my opinion the Yealink Systems contain the advantages of Audio and Display Data Communications.

135. Claim 1 of the '237 Patent claims, in part, Audio and Display Data Communications:

> 1. A method for connecting a processing device to a communications network, the processing device having a memory, a display, an operating system and communication between processing device and a class of peripheral devices, the method comprising:
>
> a) coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device, and presenting the external peripheral device to the processing device as a human interface device;

b) *communicating at least one of audio data and display data from the processing device to the external peripheral device via the human interface device;*

c) reading the audio data from the port,

d) connecting the processing device to a communications network via the transceiver, and

e) *display data and audio data being routed between the processing device and the communication network via the transceiver and further to a base node.*

136. As required by claim 1, at least audio data or at least display data is shared from the processing device to the base node via the Dongle Tool (more specifically, the human interface device of the dongle) over the wireless communications network.

137. The '237 Patent teaches communication of at least screen scraped data shared over the wireless communications network via the dongle. The '237 Patent, 24:33-37. Further, the '237 Patents describes transfer of audio data, which I address in more detail in Section X.E. The '237 Patent, 30:9-18, 30:56-63.

138. It is my opinion that each of the Barco System and Yealink System provide Audio and Display Data Communications as described in the '237 Patent. Both Barco and Yealink advertise the Audio and Display Data Communications:

[redacted] – [redacted]

Barco System	Yealink System
 BARCO_0066438.	 YEALINK_00002088.

139. The images below show the Barco System and Yealink System share display data from the Test Machine, which is shared via the ClickShare Button or WPP30 over the wireless communications network:

Barco System	Yealink System
 BARCO_0067538.	 BARCO_0067540.

140. While the video was shared, I also observed transmission of the audio data over the wireless communications network.

141. For further analysis of the Barco System with respect to claim 1 of the '237 Patent, please refer to Appendix B.

[redacted] – [redacted]

142. It is also my opinion that the Yealink System practices claim 1 of the '237 Patent, and Yealink has admitted the Yealink System infringes claims 1-5, 7-8, and 19 of the '103 Patent.

E. Preinstalled Generic Drivers

143. Another key aspect of the Tools is the use of *Preinstalled Generic Drivers*. For example, the '002 Patent (among other Asserted Patents) claims use of Preinstalled Generic Drivers.

144. As illustrated in Appendix B, it is my opinion that the Barco System practices claims 1 and 5 of the '002 Patent.

145. Yealink has admitted the Yealink Systems infringed claims 1-7 and 10 of the '002 Patent. ECF 85, Third Amended Answer, ¶41.

146. Based on my review, I agree with Yealink's admissions, and it is my opinion the Yealink Systems contain the advantages of Preinstalled Generic Drivers.

147. Claim 1 of the '002 Patent claims, in part, use of preinstalled generic drivers to communicate data:

> 1. A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a communications protocol for communication between the processing device and a class of peripheral devices, the method comprising:
>
> a) coupling an external peripheral device physically to a port of the processing device,
>
> wherein the peripheral device comprises a wireless transceiver and a connector, said connector configured to couple to the port of the processing device;

b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device;

c) using the peripheral device to connect the processing device to a communications network via the wireless transceiver;

d) routing audio data from the processing device to the wireless transceiver via the connector of the peripheral device and the means for audio communication and routing the audio data from the wireless transceiver of the peripheral device to a base node over the communications network, *wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.*

148. As required by claim 1 above, a Preinstalled Generic Driver, like a preinstalled generic audio driver, is used to communicate data between the dongle and the device the dongle is coupled to.

149. Transmission of audio in "screen scrape" like applications is nontrivial, but by relying on the availability of plug and play interfaces such as USB, there is standard built-in support for USB audio devices. The '002 Patent, 29:56-65, 30:36:43. As such, the dongle presents as a virtual audio device (or a composite device) that uses preinstalled generic drivers and is available from the standard audio interface GUI on the processing device. The '002 Patent, 30:44-55.

[redacted] – [redacted]

150. It is my opinion that the Barco System and Yealink System use preinstalled generic drivers.

151. Both Barco and Yealink advertise the ease of connecting with room equipment without installation unique drivers :

Barco System	Yealink System
 **Plug in and go with the ClickShare Button** With the ClickShare Button you start your wireless video meeting or share content on the meeting room display. Plug the USB-C device into your laptop and within seconds, you are automatically connected to the meeting room equipment. Even guests can join this way! BARCO_0066433.	 Hardware Encoding Solution, Burden-free for PC Operation WPP30 adopts the built-in hardware encoding chip solution. No need to install any software or driver, and no CPU occupied. No extra time for device debugging, start a meeting immediately and provide you with a smoother screen sharing experience. YEALINK_00002088.

152. For example, as annotated in the images below, the ClickShare Button and WPP30, when connected to the Test Machine, presents multiple different devices:

[redacted] – [redacted]

[redacted]

153. USB input device, USB mass storage devices, USB composite devices, and USB audio devices use pre-installed generic drivers.

154. Additionally, when connected, the audio endpoints of the Barco System and Yealink System are presented in the standard audio interface GUI of the Test Machine:

[redacted]

155. For further analysis of the Barco System with respect to claim 1 of the '002 Patent, please refer to Appendix B.

[redacted] – [redacted]

156. It is also my opinion that the Yealink System practices claim 1 of the '002 Patent, and Yealink has admitted the Yealink System infringes claims 1-7 and 10 of the '103 Patent.

F. Portable Application

157. Another key aspect of the Tools is the use of a Portable Application. For example, the '676 Patent (among other Asserted Patents) claims use of a client application.

158. As illustrated in Appendix B, it is my opinion that the Barco System practices claims 1 and 2 of the '676 Patent.

159. Yealink has admitted the Yealink Systems infringed claims 1-20 of the '676 Patent. ECF 85, Third Amended Answer, ¶71.

160. Based on my review, I agree with Yealink's admissions, and it is my opinion the Yealink Systems contain the advantages of Preinstalled Generic Drivers.

161. Claim 1 of the '676 Patent claims, in part, use of a Portable Application:

1. A method for connecting one or more processing devices, each processing device being a user device of one participant in a meeting with a plurality of participants, to a wireless communications network having a base node with one or more first displays, the one or more processing devices each having a memory, a second display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between the processing device and a class of peripheral devices, the method comprising the following steps for each processing device:

a) coupling a peripheral device to the processing device, the peripheral device having a wireless transceiver;

[redacted] – [redacted]

b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

c) coupling the processing device to the wireless com-munications network via the peripheral device; *running a client application stored on the peripheral device to obtain screen scraped data;*

d) routing the screen scraped data between the processing device and the wireless communications network via the means for communication for display on the one or more first displays of the base node, wherein the generic communication protocol is used for transfer-ring the screen scraped data for display between the processing device and the peripheral device; and

e) obtaining electronic access to the one or more first displays for display of the screen scraped data; the method further comprising:

displaying the screen scraped data on the one or more first displays in accordance with a set of rules, one of the rules being a forcing rule, wherein the forcing rule is that display on the one or more first displays of new screen scraped data is obtained by the action of only one participant involved in the meeting, without requir-ing the agreement of another participant, the new screen scraped data of any participant for display overrides or replaces any data displayed on the one or more first displays from the same or another participant of the meeting.

[redacted] – [redacted]

162. The Portable Application that is on the Dongle Tool not the processing device is able to collect screen scraped data on the processing device when the Dongle Tool is connected to the processing devices.

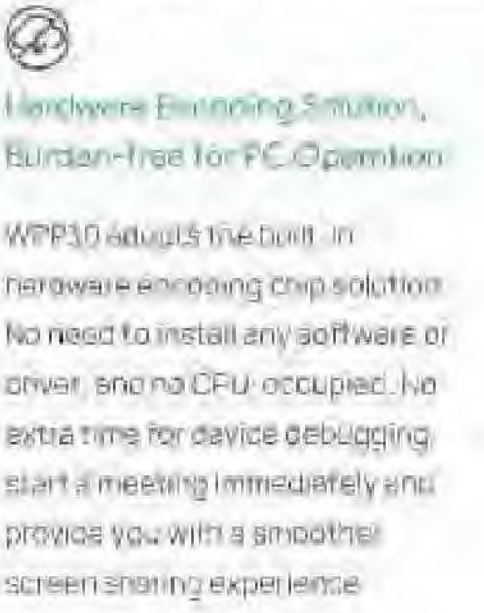
163. The Portable Application is also described in other claims, such as claim 5 of the '002 Patent and claim 4 of the '237 Patent.

164. The Portable Application (also called a client application) is stored on the Dongle Tool and is executed on the processing device. The '676 Patent, 24:65-67. Additionally, the Portable Application does not need to be copied to or installed on the computer, but is executed directly on the connection unit, and is only copied temporarily into an execution context. The '676 Patent, 24:67-25:3.

165. It is my opinion that the Barco System and Yealink System uses a Portable Application.

166. Both Barco and Yealink advertise use of a Portable Application or that no software is installed and the sharing is performed without CPU-occupation:

[redacted] – [redacted]

Barco System	Yealink System
 **Step 1:** Insert a Button into your laptop **Step 2:** On your laptop, browse to the ClickShare drive and start the ClickShare application: ClickShare_for_Windows or ClickShare_for_Mac BARCO_0048706.	 Hardware Encoding Solution, Burden-free for PC Operation WPP30 adopts the built-in hardware encoding chip solution. No need to install any software or driver, and no CPU occupied. No extra time for device debugging, start a meeting immediately and provide you with a smoother screen sharing experience. YEALINK_00002088.

167. The images below show a ClickShare executable and Presentation Launcher executable could be run on the Test Machine when the ClickShare Button and WPP30 are connected to the Test Machine:

Barco System	Yealink System
 CD Drive (D:) ClickShare BARCO_0067508.	 CD Drive (D:) WPP30 BARCO_0067509.

[redacted] – [redacted]

168. Further, when each executable is run, they allow the user to share screen scraped data:

Barco System	Yealink System
	
BARCO_0067513	BARCO_0067527

169. For further analysis of the Barco System with respect to claim 1 of the '676 Patent, please refer to Appendix B.

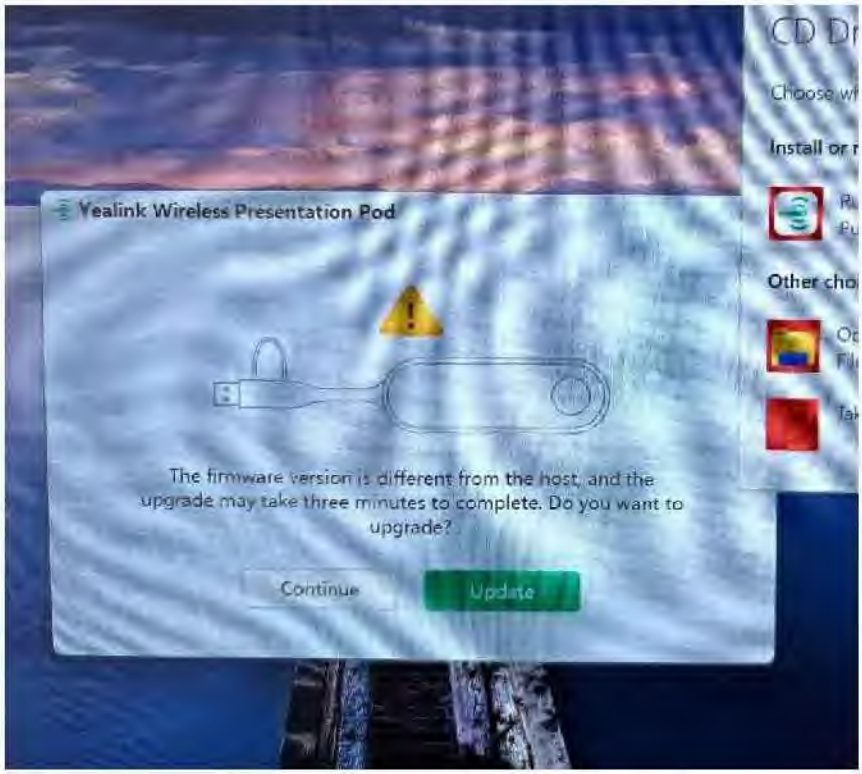
170. It is also my opinion that the Yealink System practices claim 1 of the '676 Patent, and Yealink has admitted the Yealink System infringes claims 1-20 of the '676 Patent.

XIV. CONTINUED AVAILABILITY OF WPP30

171. I understand that on April 25, 2024, Yealink announced they would no longer be selling the WPP30 in the United States. BARCO_0052475.

172. When the WPP30 is connected to a computer, the WPP30 may automatically request a firmware update be performed:

[redacted] – [redacted]



BARCO_0067529

173. Upon reviewing Yealink's Support Webpage, I understand that the most recent firmware update became available in July 16, 2024, after Yealink's alleged "End of Availability" announcement. BARCO_0067469.

174. I understand that Yealink still supports the use of the WPP30 in the United States, and that Yealink has not disabled WPP30-related features on Yealink devices sold in the United States. Cai Dep., 56:18-57:3, April 13, 2025.

175. I also understand that Yealink could have issued an update to disable the use of the WPP30 and could disable the WPP30-related features through a firmware update issued in the United States. Cai Dep., 57:10-13, April 13, 2025.

176. In my opinion, Yealink could have issued a firmware update to disable the use of WPP30 in the United States and instead continues to actively support it, including through ongoing firmware updates. BARCO_0067554-BARCO_0067556.

[redacted] – [redacted]

177. I have reviewed the Wayback Machine, an online service provided by The Internet Archive, as it relates to matters in the past and for establishing the prior art status of certain documents and websites. Based on my prior experiences with the Wayback machine and the information I have reviewed from the Internet Archive, it is my understanding that when archived records are available for a specific URL, the visitor to the archived website will be presented with a display of dates for which that archived website has been archived. The Internet Archive assigns URLs for these archived websites based on the date and time the URL was archived. Such that the URLs use the following format: http://web.archive.org/web/[YEAR in yyyy][Month in mm][Day in dd][Time in HHMMSS]/ARCHIVED URL. So the URL https://web.archive.org/web/20250403202329/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10 refers to the archived version of https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10 captured on April 3, 2025 at 8:23:29 pm.

178. I checked https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10 on Sunday, April 27, 2025 where I observed that Yealink is presently directing its customers to use the WPP30 dongle with the MeetingBar A10 (directing Yealink's customers that the "MeetingBar A10 creates a plug-and-share experience with the WPP30 presentation pod."). I

[redacted] – [redacted]

have also checked various dates of the same website using the Wayback Machine and have found that Yealink has continued to direct its customers to do the same throughout 2025.[4][5][6][7]

https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10.

179. I checked https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a20 on Sunday, April 27, 2025 where I observed that Yealink is presently directing its customers to use the WPP30 dongle with the MeetingBar A20 (directing Yealink's customers that

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[4] https://web.archive.org/web/20250423204331/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10 (a screen capture from April 23, 2025, directing Yealink's customers that the "MeetingBar A10 creates a plug-and-share experience with the WPP30 presentation pod.")

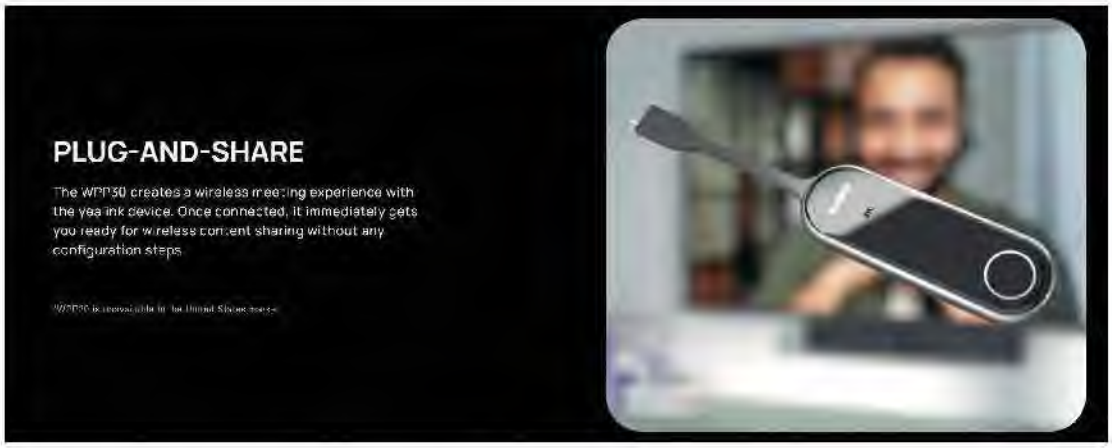
[5] https://web.archive.org/web/20250403202329/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10 (a screen capture from April 3, 2025, directing Yealink's customers that the "MeetingBar A10 creates a plug-and-share experience with the WPP30 presentation pod.")

[6] https://web.archive.org/web/20250323004733/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10 (a screen capture from March 23, 2025, directing Yealink's customers that the "MeetingBar A10 creates a plug-and-share experience with the WPP30 presentation pod.")

[7] https://web.archive.org/web/20250102033220/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a10 (a screen capture from January 4, 2025, directing Yealink's customers that the "MeetingBar A10 creates a plug-and-share experience with the WPP30 presentation pod.")

[redacted] – [redacted]

the "WPP30 creates a wireless meeting experience with the Yealink device. Once connected, it immediately gets you ready for wireless content sharing without any configuration steps."). I have also checked various dates of the same website using the Wayback Machine and have found that Yealink has continued to direct its customers to do the same throughout 2025.[8]



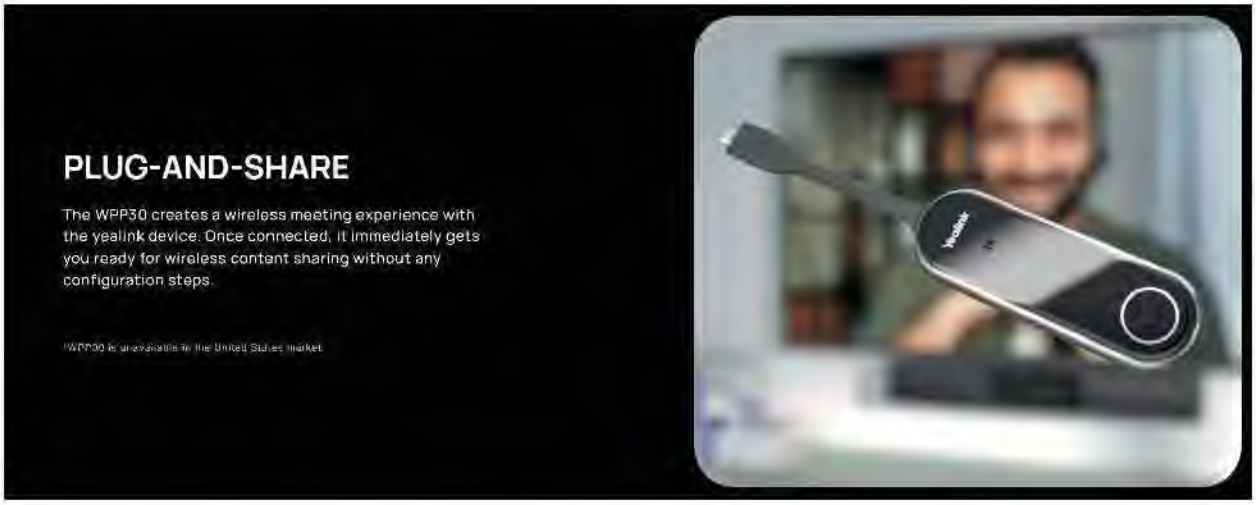
https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a20.

180. I checked https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a30 on Sunday, April 27, 2025 where I observed that Yealink is presently directing its customers to use the WPP30 dongle with the MeetingBar A30 (directing Yealink's customers that the "WPP30 creates a wireless meeting experience with the Yealink device. Once connected, it immediately gets you ready for wireless content sharing without any configuration steps."). I have

[8] https://web.archive.org/web/20250424005532/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a20 (a screen capture from April 23, 2025, directing Yealink's customers that the "WPP30 creates a wireless meeting experience with the Yealink device. Once connected, it immediately gets you ready for wireless content sharing without any configuration steps.")

[redacted] – [redacted]

also checked various dates of the same website using the Wayback Machine and have found that Yealink has continued to direct its customers to do the same throughout 2025.[9][10][11][12]



https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a30.

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[9] https://web.archive.org/web/20250424010510/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a30 (a screen capture from April 23, 2025, directing Yealink's customers that the "WPP30 creates a wireless meeting experience with the Yealink device. Once connected, it immediately gets you ready for wireless content sharing without any configuration steps.")

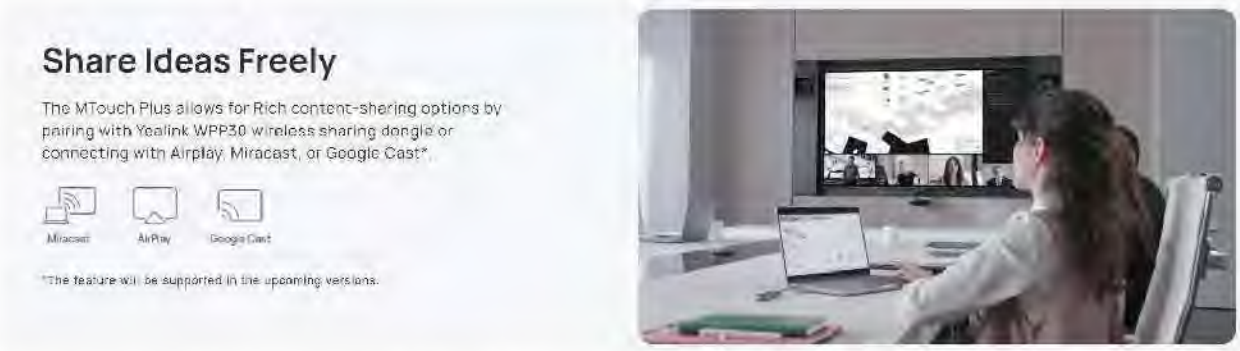
[10] https://web.archive.org/web/20250220180507/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a30 (a screen capture from February 20, 2025, directing Yealink's customers that the "WPP30 creates a wireless meeting experience with the Yealink device. Once connected, it immediately gets you ready for wireless content sharing without any configuration steps.")

[11] https://web.archive.org/web/20250208004624/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a30 (a screen capture from February 8, 2025, directing Yealink's customers that the "WPP30 creates a wireless meeting experience with the Yealink device. Once connected, it immediately gets you ready for wireless content sharing without any configuration steps.")

[12] https://web.archive.org/web/20250104105129/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingbar-a30 (a screen capture from January 4, 2025, directing Yealink's customers that the "WPP30 creates a wireless meeting experience with the Yealink device. Once connected, it immediately gets you ready for wireless content sharing without any configuration steps.")

[redacted] – [redacted]

181. I checked https://www.yealink.com/en/product-detail/accessories-mtouchplus on Sunday, April 27, 2025 where I observed that Yealink is presently directing its customers to use the WPP30 dongle with the MTouchPlus (directing Yealink's customers that the "MTouch Plus allows for Rich content-sharing options by pairing with Yealink WPP30 wireless sharing dongle[.]"). I have also checked various dates of the same website using the Wayback Machine and have found that Yealink has continued to direct its customers to do the same throughout 2025.[13]



https://www.yealink.com/en/product-detail/accessories-mtouchplus.

182. I checked https://www.yealink.com/en/product-detail/roomcast on Sunday, April 27, 2025 where I observed that Yealink is presently directing its customers to use the WPP30 dongle with the RoomCast (directing Yealink's customers that the "RoomCast allows user to enjoy one-touch sharing for easy and productive collaboration with Yealink Wireless Presentation

[13] https://web.archive.org/web/20250424011846/https://www.yealink.com/en/product-detail/accessories-mtouchplus (a screen capture from April 23, 2025, directing Yealink's customers that the "MTouch Plus allows for Rich content-sharing options by pairing with Yealink WPP30 wireless sharing dongle[.]")

[redacted] – [redacted]

Pod[.]"). I have also checked various dates of the same website using the Wayback Machine and have found that Yealink has continued to direct its customers to do the same throughout 2025.[14][15][16]

https://www.yealink.com/en/product-detail/roomcast.

183. I checked https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingboard65 on Sunday, April 27, 2025 where I observed that Yealink is presently directing its customers to use the WPP30 dongle with the MeetingBoard (directing Yealink's customers to "[e]njoy plug-and-share wireless presentation with WPP30."). I have also checked various dates

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[14] https://web.archive.org/web/20250424012835/https://www.yealink.com/en/product-detail/roomcast (a screen capture from April 23, 2025, directing Yealink's customers that the "RoomCast allows user to enjoy one-touch sharing for easy and productive collaboration with Yealink Wireless Presentation Pod[.]")

[15] https://web.archive.org/web/20250404044633/https://www.yealink.com/en/product-detail/roomcast (a screen capture from April 4, 2025, directing Yealink's customers that the "RoomCast allows user to enjoy one-touch sharing for easy and productive collaboration with Yealink Wireless Presentation Pod[.]")

[16] https://web.archive.org/web/20250104105142/https://www.yealink.com/en/product-detail/roomcast (a screen capture from January 4, 2025, directing Yealink's customers that the "RoomCast allows user to enjoy one-touch sharing for easy and productive collaboration with Yealink Wireless Presentation Pod[.]")

[redacted] – [redacted]

of the same website using the Wayback Machine and have found that Yealink has continued to direct its customers to do the same throughout 2025.[17][18][19][20]

https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingboard65.

184. In my opinion, Yealink has not disabled the use of the WPP30 in the United States. As a result, it is my opinion that Yealink continues to induce the infringement of its customers in the United States in 2025.

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[17] https://web.archive.org/web/20250424013459/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingboard65 (a screen capture from April 23, 2025, directing Yealink's customers to "[e]njoy plug-and-share wireless presentation with WPP30.")
[18] https://web.archive.org/web/20250402192700/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingboard65 (a screen capture from April 2, 2025, directing Yealink's customers to "[e]njoy plug-and-share wireless presentation with WPP30.")
[19] https://web.archive.org/web/20250212102520/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingboard65 (a screen capture from February 12, 2025, directing Yealink's customers to "[e]njoy plug-and-share wireless presentation with WPP30.")
[20] https://web.archive.org/web/20250104105123/https://www.yealink.com/en/product-detail/microsoft-teams-rooms-meetingboard65 (a screen capture from January 4, 2025, directing Yealink's customers to "[e]njoy plug-and-share wireless presentation with WPP30.")

[redacted] – [redacted]

XV. THE CRESTRON SYSTEM PRACTICES CLAIMS OF THE ASSERTED PATENTS.

185. I understand that Crestron has obtained a license from Barco regarding multiple patents, which includes the Asserted Patents. BARCO_0052309-BARCO_0052327.

186. It is my opinion that the Crestron System practice certain claims of the Asserted Patent. For exemplary purposes, I illustrate that the Crestron System practices at least claim 1 of the '832 Patent.

A. Claim 1 of the '832 Patent

1. A peripheral device comprising:
[a] a base,

187. It is my opinion that the Crestron System practices this element.

188. For example, the Crestron System includes a peripheral device, the Adapter, which includes a base:

BARCO_0067542.

[redacted] – [redacted]

2. [b] connector configured to connect to a serial plug and play port of a host processing device,

189. It is my opinion that the Crestron System practices this element.

190. For example, the Adapter includes a serial plug and play port, which is configured to connect to a host processing device:

BARCO_0067542.

3. [c] a flexible connection between the base and the connector configured to transfer data signals and power, and,

191. It is my opinion that the Crestron System practices this element.

192. For example, the Adapter includes a flexible connection between the base and the connector, which carries data signals and power:

[redacted] – [redacted]

BARCO_0067542.

4. [d] wherein the base has electronics comprising a wireless transceiver and a processing engine, wherein said wireless transceiver and the processing engine are configured to connect the peripheral device directly to a wireless communications network, and

193. It is my opinion that the Crestron System practices this element.

194. For example, the Adapter includes a wireless transceiver and processing engine, as evidenced by its WiFi communications capabilities:

Communications	
Wi-Fi	WiFi 6 (802.11ax)
USB	USB 2.0
OS Support	Windows 10, Windows 11, macOS® 11 or newer

BARCO_0067557.

195. Additionally, the Adapter also includes encryption which requires use of a processing engine:

[redacted] – [redacted]

XiO Cloud® service. It employs standard network security protocols, including 802.1x network access control, Active Directory® authentication, and AES content encryption to protect privacy and ensure compliance with your organization's IT policies.

BARCO_0067557.

5. [e] a physical actuator on the base being configured to actuate a signal and to transfer the signal to the connector to transfer to the serial plug and play port via at least one pre-installed generic driver for the port,

196. It is my opinion that the Crestron System practices this element.

197. For example, the Adapter includes touch buttons:

BARCO_0067542.

198. By pressing the button on the left, the peripheral devices connected to the Receiver become available. For example, in the image below from the USBDeview tool, Crestron's Adapter provides endpoints to USB audio, composite, and video devices:

[redacted] – [redacted]

BARCO_0067543.

199. These devices use preinstalled generic drivers like usbccgp.sys, usbaudio.sys, and usbvideo.sys.

6. [f] and the serial plug and play port is configured to receive thereafter image data displayed on the host processing device,

200. It is my opinion that the Crestron System practices this element.

201. The Adapter receives image data from the plug and play port of the host processing device in order to share the screen of the host processing device. An image of the screen being shared via the Adapter is shown below:

[redacted] – [redacted]

BARCO_0067544.

7. [g] wherein the physical actuator is configured to be activated by a user action applied to the physical actuator which triggers delivery of the image data from the host processing device via the serial plug and play port to the wireless transceiver, and from the wireless transceiver to the wireless communications network.

202. It is my opinion that the Crestron System practices this element.

203. For example, in the image below, no image data is displayed on the Monitor connected to the Receiver before Adapter buttons are pressed:

[redacted] – [redacted]

BARCO_0067546.

204. However, after pressing the buttons on the Adapter, image data is shared:

BARCO_0067544.

[redacted] – [redacted]

B. Claim 1 of the '103 Patent

1. A peripheral device comprising:
[a] a base,

205. It is my opinion that the Crestron System practices this element for the same reasons outlined in Section XII.A.1.

2. [b] a connector for connection to a serial plug and play port of a host processing device

206. It is my opinion that the Crestron System practices this element for the same reasons outlined in Section XII.A.2.

3. [c] a flexible connection between the base and the connector,

207. It is my opinion that the Crestron System practices this element for the same reason outlined Section XII.A.3.

4. [d] a transceiver for communicating with a communications network,

208. It is my opinion that the Crestron System practices this element for the same reasons outline Section XII.A.4.

5. [e] a physical actuator on the base configured to allow user action to actuate the physical actuator to trigger transfer of a signal to the connector to transfer to the serial plug and play port via at least one pre-installed generic driver for the serial plug and play port, and

209. It is my opinion that the Crestron System practices this element for the same reasons outlined Section XII.A.5.

6. [f] the serial plug and play port being configured to receive arbitrary media content on the host processing device,

210. It is my opinion that the Crestron System practices this element for the same reasons outlined in Section XII.A.6.

7. [g] wherein the base has a visual indicator which is also activated by the user action applied to the physical actuator,

211. It is my opinion that the Crestron System practices this element.

[redacted] – [redacted]

212. The base includes indicators that are activated by a user action. The indicator is shown below:

BARCO_0067542.

213. Prior to a user action, when no image data is shared, and the peripherals are unavailable to the host processing device, the indicators are red and white:

[redacted] – [redacted]

BARCO_0067546.

214. Once the user presses the physical actuators, image data is shared to the display from the host processing device via the Adapter, and the indicators are both green:

BARCO_0067544.

8. [h] wherein the physical actuator is configured to be activated by the user action applied to the physical actuator to trigger delivery of the arbitrary media content on the host processing device to said transceiver on the computer peripheral device through said serial plug and play port, and from the transceiver to the communications network,

215. It is my opinion that the Crestron System practices this element for the reasons outlined in Section XII.B.7.

9. [i] wherein the visual indicator is configured in a way such that the user action by actuating the physical actuator indicates to the user whether or not the arbitrary media content is being sent from the at least one peripheral device to the communications network.

216. It is my opinion that the Crestron System practices this element for the reasons outlined in Section XII.B.7.

XVI. CONCLUSION

217. I reserve the right to amend or supplement my opinions as outlined herein as this case proceeds and as any additional information comes to light.

Dated: April 27, 2025

Signed by:
Dr. Michael C. Brogioli
A19F56ECD78AD449...

Dr. Michael C. Brogioli

Appendix A

Michael C. Brogioli, Ph.D.

Contact Information

Michael C. Brogioli, Ph.D.
Polymathic Consulting
501 Congress Avenue, Suite 150
Austin, TX 78701 USA

Office: (737) 317-2301
Cell (preferred): (713) 732-0217
Fax: (512) 469-6306
E-mail: michael@polymathicconsulting.com

Education

Rice University, Houston, Texas USA

Ph.D., Electrical and Computer Engineering, 2007

- Dissertation Topic: "Reconfigurable Heterogeneous DSP/FPGA Based Embedded Architectures for Numerically Intensive Embedded Computing Workloads."
- Advising Committee: Dr. Joseph R. Cavallaro, Dr. Keith D. Cooper, Dr. Scott Rixner

Rice University, Houston, Texas USA

M.S., Electrical and Computer Engineering, 2003

- Dissertation Topic: "Dynamically Reconfigurable Data Caches in Low Power Computing."
- Advising Committee: Dr. Keith D. Cooper, Dr. Scott Rixner, Dr. Robert Jump

Rensselaer Polytechnic Institute, Troy, New York USA

B.S., Electrical Engineering, Cum Laude, 1999

- Advisor: Dr. William Pearlman

Certificates

Harvard Business School, Boston, Massachusetts, USA

Certificate in Investment Portfolios with Alternate Investments, 2022

- Venture Capital, Growth Equity, Distress Investing, Private Debt, Hedge Funds, Portfolio Construction.

Professional Experience

Polymathic Consulting, TX USA
Managing Director **2011 - Present**
Founder and managing director of Polymathic Consulting, servicing clients ranging from early stage technology start-up endeavors to Fortune 100 and beyond. Clients turn to Polymathic for expansive, proven engineering, research and development, intellectual property and technical leadership to effectively advance their real world business needs.

IEEE and ACM Design Automation Conference, USA
Steering Committee
Conference Chair, Embedded Systems and Software Track **2016 - Present**
Design Automation Conference is the premiere technical conference and trade show specializing in Hardware, Software, Internet of Things, Embedded Systems and related Design Methodologies. Conference chair, responsible for the review, critique, and acceptance of academia and industry based publications in the areas of embedded systems, embedded software, and embedded system design.

Rice University, TX USA
Adjunct Professor, Electrical and Computer Engineering **2009 - Present**
Professor of Ph.D. candidate level courses in wireless telecommunications, embedded computing software, embedded computing hardware, and software/hardware optimization in modern computing systems utilizing modern high level programming languages. Advisor of senior and graduate student based projects revolving around multi-core heterogeneous systems as they pertain to wireless telecommunications, medical and video.

University of Texas, Austin, TX USA
Guest Lecturer, School of Engineering **2021 - Present**
Guest lecturer in "Legal Issues and Technology Management", on subjects relating to technology, management, financial and fund raising matters, technology transfer, and certain legal issues. Students are primarily comprised of those with existing degrees, and a number of years of industry experience.

RISC-V Foundation, Berkeley, CA USA
Technical Committee **2018 - Present**
RISC-V is an open CPU instruction set architecture (ISA) based on established reduced instruction set computing (RISC) principles. The RISC-V Foundation is a non-profit consortium chartered to standardize, protect, and promote the free and open RISC-V instruction set architecture together with its hardware and software ecosystem for use in all computing devices.

Freescale Semiconductor, TX USA
Chief Architect, Senior Member Technical Staff **2009 - 2011**
Technical architect of Freescale's DSP compilers and related technology. Responsible for management of technology, engineering roadmaps, design lead on compiler infrastructure and optimizations (high level and low level), next generation ABI definitions and next generation architecture solutions. Technical lead on multi-year engagement with processor architects in design of next generation DSP cores. Developed software infrastructure for migrating OEM competitor software stacks to Freescale solutions, tools generation, software packages, migration strategies and white papers. Technical lead on Tier-1 OEM customer relationships, evaluations of 3rd party technologies for potential partnerships and acquisitions, led various university research collaborations on behalf of Freescale. Development and deployment of internal software engineering policies and practices.

Freescale Semiconductor, TX USA
Senior Compiler Engineer V
High Performance Compiler Design, Processor Architecture **2007 - 2009**
Team leader on compiler engineering effort to provide intuitive, interactive end user experience for DSP compiler tool suite. Designed a framework to guide users in achieving highly optimized compiled VLIW code. Assembly listing reports for optimization failure advice, porting advice when migrating from competitor architectures, advice on code modifications for optimization enablement. Lead designer, engineering effort director, project planning and scoping, release schedule, and drafting of specification. Development of various compiler optimizations for VLIW processing as well as software emulation layers for running competitor software solutions on Freescale silicon.

Advising of next-gen DSP core architecture team in creating a highly orthogonal, compiler targetable multi-clustered VLIW based digital signal processor architecture. Work with future basestation architecture teams on designing next-gen basestation architecture for 4G LTE incorporating control and data plane processing with appropriate programming models.

Method Seven, MA USA
Technical Co-Founder
High Performance Software and Hardware Systems Architecture **2006 - 2007**
Founded Method Seven, a financial engineering company applying biologically inspired machine learning to financial market analysis. Principal software systems architect and hardware systems architect for both research and deployment platforms. Led research and development of platform for scans and overlays covering the NASDAQ, NYSE, and AMEX markets using proprietary technologies.

Texas Instruments, TX USA
Advanced Architecture and Chip Technologies
Microprocessor and Systems Architecture **2005**

System modelling and architectural exploration of Davinci™system-on-chip (SOC) architecture designed for embedded video processing. SystemC based simulation models of on–chip crossbars, bus arbitration and bridge technology, as well as on–chip and off–chip memory controllers within application specific heterogeneous SOC architectures.

Fulbright and Jaworski LLP, TX USA
Scientific Advisor, Intellectual Property
Electrical, Computer Engineering and Computer Science **2005 - 2007**
Intellectual property consultant and technology advisor on litigation and prosecution work including, but not limited to: CDMA2000 3G wireless standards, wireless communications systems, embedded computing, and large scale modular software systems. Reverse engineering of source code varying from VHDL to high level object oriented applications, as well at patent prosecution and litigation work.

Intel Corporation, CA USA
Microprocessor Research Labs
Compiler Engineering **2000**
Implemented speculative multi–threading support in Intel's IA–64 compiler. Developed new program analysis and back end code generation phases to support speculatively launching threads at runtime. Analyzed the performance potentials of SPEC95 benchmarks with respect to speculatively multi–threaded execution.

Rice University, TX USA
Computer Architecture and Circuit Design (Instructor) **2000 - 2003**
Graduate instructor of graduate and undergraduate curriculum in the areas of Electrical and Computer Engineering, specifically relating to Computer Architecture and Circuit Design. Advised student projects, instructed classes and led laboratory work.

Vicarious Visions, NY USA
Lead Software Engineer **1999**
Principal engineer on Activision's "AMF Extreme Bowling" for Nintendo's Color Gameboy gaming console. Developed PC based audio and graphics development tools suite for use with Color Gameboy game production. Coded innovative, highly optimized assembly routines for real time speech and full motion video on the console's limited Zilog Z80 processor resources.

Stratus Computer, MA USA
Hardware Engineering **1997 - 1998**
Debugged locked step CPU operation and memory management issues in Stratus' fault tolerant UNIX release 3.4. Qualified Hewlett Packard PA–8000 series CPU modules under Stratus' proprietary OS release, VOS 14.0, during alpha and beta test phases. Wrote C code and UNIX shell scripts for recreating documented system failures, and to automate remote kernel updates and OS installs as well as data logging.

Rensselaer Polytechnic Institute, NY USA
Digital Microelectronics Design (Instructor) **1997 - 1998**
Undergraduate instructor of undergraduate courses in digital microelectronics and circuit design. Instructed weekly lessons, computer design labs, graded exams and problem sets.

Rensselaer Electric Motor Sports, NY USA
Hardware and Software Engineering **1995 - 1997**
This project was funded by, and led by, General Motors Corporation and Honda of America. Hardware and software co-design of embedded operating system and hardware platform for electrical vehicle prototypes, running on 16-bit Motorola 68K dual processor platform. Designed power engineering test platform for dynamometers, including hardware and user interface software.

Appointed Conference Committees and Organizations

IEEE International Conference on Communications, USA
Technical Review Committee, Machine Learning for Communications Track **2021 - Present**
Technical committee member responsible for the review, critique, and acceptance of academia and industry based publications and research in the areas of machine learning for communications systems.

IEEE International Symposium on Circuits and Systems, USA
Technical Review Committee **2021 - Present**
Technical committee member responsible for the review, critique, and acceptance of academia and industry based publications and research in the areas of computing, including energy aware systems, multicore processing, and adaptive computing.

IEEE and ACM Design Automation Conference, USA
Technical Steering Committee, Embedded Computing Track **2019 - Present**
Technical Steering Committee member responsible for the review, critique, and acceptance of academia and industry based publications and research in the area of embedded computing and related systems, including embedded hardware, embedded software, firmware and tools.

IEEE and ACM Design Automation Conference, USA
Co-chair, Program Committee, Embedded Systems and Software Track **2014 - 2019**
Co-chair and Program Committee member responsible for the review, critique, and acceptance of academia and industry based publications in the areas of embedded systems, embedded software, and embedded system design. Design Automation Conference is an annual technical conference and trade show specializing in electronic systems.

IEEE and ACM Design Automation Conference, USA
Program Committee, Designer and User Track **2011 - Present**
Program Committee member responsible for the review, critique, and acceptance of academia and industry based publications in the areas of automated system design, both of hardware, software, and system analysis. Design Automation Conference is an annual technical conference and trade show specializing in electronic systems.

ACM Great Lakes Symposium on VLSI, Stresa-Lago Maggiore, Italy
Program Committee **2007**
Reviewer and committee member in the area of system-on-chip architectures, VLSI design, and compiler driven architecture design space exploration.

IEEE International Symposium on Personal Indoor and Mobile Radio Communications, Helsinki, Finland
Program Committee **2006**
Reviewer and committee member in the area of personal and mobile area radio communications and related systems.

ACM International Conference on Parallel Architectures and Compilation Techniques, Charlottesville, VA, USA
Program Committee **2002**
Reviewer and committee member in the area of parallel computer architectures, programming languages and related compiler technologies.

Books and Contributed Chapters

Brogioli, Michael C., and Kraeling, Mark B., *Internet of Things - A Synopsis of the Internet of Things, its History, Application, Technology, Architecture, and Challenges Moving Forward*, Software Engineering for Embedded Systems - Methods, Practical Techniques and Applications, 2nd Edition, Elsevier Publishing, 2019.

Brogioli, Michael C., *Software and Compiler Optimization for Microcontrollers, Embedded Processors and DSPs*, Software Engineering for Embedded Systems - Methods, Practical Techniques and Applications, 2nd Edition, Elsevier Publishing, 2019.

Brogioli, Michael C., *Embedded and Multicore System Architecture - Design and Optimization*, Software Engineering for Embedded Systems - Methods, Practical Techniques and Applications, 2nd Edition, Elsevier Publishing, 2019.

Leotescu, Florin, and Cristian, Marius and Brogioli, Michael C., *Performance Analysis using NXP's i.MX RT1050 Crossover Processor and the Zephyr Real-Time Operating System*, Software Engineering for Embedded Systems - Methods, Practical Techniques and Applications, 2nd Edition, Elsevier Publishing, 2019.

Wu, Michael and Sun, Yang and Wang, Guohui and Brogioli, Michael C. and Cavallaro, J. R., *Implementation of a High Throughput 3GPP Turbo Decoder on GPU Architectures*, Software Development for Networking Applications – Expert Guides Series, Elsevier Publishing, Atlanta, GA, 2018.

Brogioli, M. C., *On The C++ Programming Language for Embedded Software, Systems, and Platforms*, Software Engineering for Embedded Systems – Expert Guides Series, Elsevier Publishing, Atlanta, GA, 2013.

Brogioli, M. C., *Software Optimizations for Memory Performance in Embedded Systems*, Software Engineering for Embedded Systems – Expert Guides Series, Elsevier Publishing, Atlanta, GA, 2013.

Invited Co-Author, *Signal Processing Systems Handbook, Second Edition*, Springer Publishing Company, 11 West 42nd Street, New York, NY, 2012.

Brogioli, M. C., *Software Programmable DSP Architectures*, Expert Guide DSP for Embedded and Real-Time Systems, pp. 63-75, Elsevier Publishing, Atlanta, GA, 2012.

Brogioli, M. C., *The DSP Hardware / Software Continuum*, Expert Guide DSP for Embedded and Real-Time Systems, pp. 103-113, Elsevier Publishing, Atlanta, GA, 2012.

Brogioli, M. C., *DSP Optimization - Memory Optimization*, Expert Guide DSP for Embedded and Real-Time Systems, pp. 217-241, Elsevier Publishing, Atlanta, GA, 2012.

Brogioli, M. C. and Dew, Stephen, *Optimizing DSP Software - High level Languages and Programming Models*, Expert Guide DSP for Embedded and Real-Time Systems, pp. 167-179, Elsevier Publishing, Atlanta, GA, 2012.

Sun, Yang, Amiri, Kiarash, Brogioli, Michael, Wang, Guohui, and Cavallaro, Joseph R., *DSP Hardware Accelerator Architectures for Communication Applications*, Springer Publishing, New York, NY, Spring 2012.

Sun, Yang, and Amiri, Kiarash, and Brogioli, Michael C., and Cavallaro, Joseph, *Application-Specific Accelerators for Communications*, Springer Publishing Company, 11 West 42nd Street, New York, NY, 2010.

Invited Co-Author, *Signal Processing Systems Handbook, First Edition*, Springer Publishing Company, 11 West 42nd Street, New York, NY, 2010.

Publications and Invited Papers

Brogioli, Michael, C., and Games, William, and Moats, Richard, *Current and Future Challenges in Internet of Things (IoT) Development Silos (Part I)*, Embedded Computing Design Magazine,

USA, 2020.

Brogioli, Michael, C., and Games, William, and Moats, Richard, *On Solving the IoT Development Silo Problem* IEEE Real-Time and Embedded Technology and Applications Symposium, Tools and Demos Session, Montreal, Canada, 2019.

Moats, Richard, and Games, Bill, and Brogioli, M. C., *Arch - A New Language For The Next Wave of Network-Connected Embedded Development*, Design Automation Conference, Austin, Texas, 2017.

Moats, Richard, and Games, Bill, and Brogioli, M. C., *Network Native - The Next Wave of Connected Embedded Development*, Network Native Inc., Austin, Texas, 2017.

Invited Paper, Arokia I, Brogioli, Michael, Jain, Nitjin and Garg, Umang, *LTE Layer 1 Software Design on Heterogeneous Multicore DSP Platforms*, IEEE 45th Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, 2011.

Kyriakopoulous, Konstantinos, Brogioli, Michael C., and Zhang, Ruihao, *Improving Software Systems Quality through Well Defined Development Methodologies*, 2011 Test Methodology and Efficiency Symposium, Freescale Semiconductor, Austin, TX, USA, 2011.

Brogioli, Michael C., and Cavallaro, J.R., *Compiler Driven Architecture Design Space Exploration for Embedded DSP Workloads: A Study in Software Programmability Versus Hardware Acceleration*, IEEE 43rd Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, 2009.

Brogioli, Michael C., and Zhang, Ruihao, *Compiler Feedback: Guiding Performance of Compiled C Code*, Freescale Semiconductor White Paper, Austin, TX, 2009.

Brogioli, M.C., and Cavallaro, J., *RISD: A Retargetable Compiler Infrastructure for Scalable Multi-Clustered VLIW DSP Architectures*, IEEE 5th Dallas Circuits and Systems Workshop, Dallas, TX, 2007.

Brogioli, Michael C., Radosavljevic, P., and Cavallaro, J., *A General Hardware/Software Codesign Methodology for Embedded Signal Processing and Multimedia Workloads*, IEEE 40th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, 2006.

Brogioli, Michael C., Radosavljevic, P., and Cavallaro, J., *Hardware/Software Co-design Methodology for DSP/FPGA Partitioning: A Case Study for Meeting Real-Time Processing Deadlines in 3.5G Mobile Receivers*, 49th IEEE International Midwest Symposium on Circuits and Systems, San Juan, Puerto Rico, 2006.

Brogioli, Michael C., Willmann, P.D., and Rixner, S., *Parallelization Strategies for Network Interface Firmware*, IEEE/ACM 4th Annual Workshop on Optimizations for DSP and Embedded Systems (In Conjunction with IEEE/ACM International Symposium on Code Generation and Optimization), Manhattan, NY, 2006.

Brogioli, Michael C., Gadhiok, M., and Cavallaro, J., *Design and Analysis of Heterogeneous DSP/FPGA Based Architectures for 3GPP Wireless Systems*, IEEE Real-Time and Embedded Technology and Applications Symposium Work-in-Progress Sessions, San Jose, CA, 2006.

Brogioli, Michael C., and Cavallaro, J., *Modelling Heterogeneous DSP-FPGA Based System Partitioning with Extensions to the Spinach Simulation Environment*, IEEE 39th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, 2005.

Joseph R. Cavallaro, Michael C. Brogioli, Alexandre de Baynast, and Predrag, Radosavljevic, *Re-*

configurable Architectures for Wireless Systems: Design Exploration and Integration Challenges, Wireless World Research Forum, Toronto, CA, 2004.

Brogioli, Michael C., Pai, V.S., Willmann, P.D., *Spinach: A Liberty–Based Simulator For Programmable Network Interface Architectures*, ACM SIGPLAN/SIGBED Conference on Languages Compilers and Tools for Embedded Systems, San Diego, CA, 2004.

Brogioli, Michael C., *Dynamically Reconfigurable Data Caches in Low Power Computing*, Masters Thesis, Rice University, Houston Texas, 2002.

Brogioli, Michael C., and Jones, Bryan, *Dynamically Configurable Caches in Low Power Computing*, Internal White Paper, Rice University, Houston Texas, 2001.

Patents

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Connected Computation in Network Constrained Systems*, U.S. Patent Application 19/065,739.

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Connected Computation in Network Constrained Systems*, U.S. Patent Application 18/242,483.

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Obtaining Location Data*, U.S. Patent Application 18/807,970.

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Aggregating Harvest Yield Data*, U.S. Patent No. 11,854,094.

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Obtaining Location Data*, U.S. Patent No. 12,066,838.

Donald W. Games, Michael C. Brogioli Ph.D., Richard Moats, *System And Method for Holistic Application Development and Deployment in a Distributed Heterogeneous Computing Environment*, U.S. Patent Application 17/745,792, filed May 2022. Patent Pending.

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Connected Computation in Network Contstrained Systems*, U.S. Patent No. 11,750,701.

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Traversing A Three Dimensional Space*, U.S. Patent No. 11,526,180.

Gregory D. Chiocco and Michael C. Brogioli, *Systems and Methods for Aggregating Harvest Yield Data*, U.S. Patent No. 11,354,757.

Donald W. Games, Michael C. Brogioli Ph.D., Richard Moats, *System And Method for Holistic Application Development and Deployment in a Distributed Heterogeneous Computing Environment*, U.S. Patent No. 11,340,887.

Michael C. Brogioli, Ph.D., Cesar Taylor M.D., and Howard Roberts, *Location Agnostic Platform for Medical Condition Monitoring and Prediction and Method of Use Thereof*, Patent No: 147145.010100/US, 2014.

Cesar Taylor M.D., and Michael C. Brogioli Ph.D., and Howard Roberts, *System for Holistic Pain Monitoring and Prediction and Method of User Thereof*, Patent No: 147145.010200/US, 2014.

Cesar Taylor M.D., and Michael C. Brogioli Ph.D., and Howard Roberts, *System for Prevention of Narcotic Diversion and Method of Use Thereof*, Patent No: 147145.010300/US, 2014.

Howard Roberts, Cesar Taylor M.D., and Michael C. Brogioli Ph.D., *Magnetometer Breathing Sensor and Method of User Thereof*, Patent No: 147145.010400/US, 2014.

Leadership and Board Membership

Tandem Motion Company FL, USA
Advisory Board **2021 - 2023**
Advisory board member on intellectual property strategy, fundraising, finance and select technologies. Tandem is building hybrid solutions for heavy duty internal combustion engine vehicles.

AgCompute CA USA
Advisory Board, Co-Inventor **2019 - Present**
Advisory board and co-inventor of patent pending technology for the advancement of Agriculture Technology in areas of low network connectivity and adverse conditions. Innovative sensor, edge and cloud computing solutions for in-field real time asset management.

MIT MassChallenge USA
Mentor, Speaker **2017 - Present**
MassChallenge is a global startup accelerator with a focus on high-impact, early-stage entrepreneurs. Through its global network of accelerators in Boston, London, Mexico City, Geneva, Jerusalem and Texas, coupled with unrivaled access to our corporate partners, MassChallenge has driven growth and created value the world over. To date, MassChallenge has raised over $2B in funding, generated over $900M in revenue, and created over 65,000 jobs.

ScribeSense, TX USA
Board of Directors **2017**
ScribeSense is a *patented* cloud-based grading platform for schools and the only solution for grading free-form paper tests. ScribeSense automatically grades handwritten tests with 99% accuracy. Teachers scan and upload their own tests using a standard school scanner. ScribeSense's visual analytics enables data-driven decision making so schools can improve student learning and retain top teacher talent.

Southwest Angel Network for Social Impact, TX USA
Board of Directors **2015 - 2019**
The Southwest Angel Network for Social Impact (SWAN Impact) is a community of like-minded investors who enjoy working together to *Make the world a better place, one company at a time.* We believe that we can have the most significant impact by funding for-profit start-up companies who are building sustainable businesses.

Network Native, TX USA
Board of Directors, Co-Founder, CTO **2015 - Present**
Board member and co-inventor, advising in the areas of Internet of Things technologies, specifically related to product developer solutions, programming languages and platforms, security and infrastrucure. Business development, marketing, and fund raising. Have held various roles, including but not limited to CTO.

NewCrew, TX USA
Advisory Board **2015 - 2016**
Board member advising in the areas of mobile computing, social computing, and geofencing technologies. Business development, marketing, and fund raising.

AngelSpan, TX USA
Advisory Board **2015 - 2016**
Board member advising in the areas of professional investor relations to start-ups, resource allocation, and a platform for increased efficiency and valuation of early stage companies and venture capital portfolios.

Vault (acquired by Summer PBC), TX USA
Advisory Board, Interim CTO **2013 - 2015**
Advisory board member and interim CTO advising in the areas of financial transactions systems and enterprise software, as they pertain to solving the student loan debt crisis for early stage science, technology, engineering and medicine (STEM) employees. Technology, recruiting, fund raising. Vault was acquired by Summer PBC in 2024.

HealthBits, TX USA
Board Member, Co-Inventor **2013 - 2014**
Board member advising in the areas of large scale enterprise software systems, real-time computing and medical sensing devices across complex event processing systems.

Osmek, TX USA
Interim CTO, Advisory Board **2012 - 2014**
Interim CTO and board member advising in the areas of large scale cloud based content management software systems. Providing innovative media content management for heterogeneous web enabled devices with geolocational services, primarily using PHP and Python programming languages.

Academia

Rice University, Houston, Texas USA
DSP Compiler Design **2005 - 2009**
Developed *RISD*, a retargetable compiler infrastructure for clustered VLIW DSP architectures. By taking pre-existing code schedules and binaries for existing DSP applications, RISD takes a flexible machine definition for which the code should be recompiled. Users can specify the number of VLIW clusters, functional units per VLIW cluster, functional unit mix per VLIW cluster, register file sizes, cluster interconnect topology (point-to-point versus 2d mesh network), multi-cluster scheduling algorithms, and inter-cluster cross-register file bandwidth and latencies.

Compiler framework was used to perform compiler driven design space exploration of massively multi-clustered VLIW based architectures versus FPGA and ASIP implementations of software kernels. RISD was used in studies comparing tradeoffs in computational throughput versus gates required to implement programmable DSP cores containing many register files and VLIW compute clusters, versus FPGA efficiency when including routing overhead for large scale problems.

Rice University, Houston, Texas USA
DSP/FPGA Based System-On-Chip Architectural Simulator Design **2004 - 2009**
Developed *Spinach DSP-FPGA*, a modular and composable simulator design infrastructure for programmable and reconfigurable embedded SOC architectures. Designed and developed modular and composable software modules to bit-true, cycle accurately simulate Texas Instruments C62x and C64x DSPs and MIPS style processors. Additionally, designed and developed support for SRAM and DRAM style memories, heterogeneous memory systems, heterogeneous clock domains, as well as runtime reconfigurable Xilinx Virtex II based FPGA computing elements, cache and memory controllers, bus arbiters, and on-chip interconnect fabric.

System was validated against compiled code DSP firmware from Texas Instruments' Code Composer Studio running on the simulator versus actual hardware benchmarks. Simulation platform was used to investigate highly heterogeneous multi-processor DSP based SOC architectures containing one or more Xilinx style FPGA based hardware coprocessors. Studies in 3.5G wireless telecommunications as well as H.26x video processing were performed to gain insight into overall system bottlenecks, hardware and software partitioning strategies, and tradeoffs of overall system design.

Rice University, Houston, Texas USA
Programmable Network Interface Architecture Simulator Design **2002 - 2004**
National Science Foundation Grant Nos. CCF-0532448 and CNS-0532452
Developed *Spinach*, a simulator design toolset for modelling programmable network interface archi-

tectures. Spinach models system components common to all programmable environments (ALUs, control and data paths, register files, instruction processing), as well as components specific to embedded computing (software controlled SRAM scratchpad memory, hardware assists for DMA and medium access control). Spinach is a simulator design infrastructure, rather than a simulator per se. As such, the same underlying C code framework is used to model a uniprocessor Gigabit network interface, a multi-processor Gigabit network interface, or a 10 Gigabit multi-processor network interface with highly heterogeneous memory systems. Only a small number of lines of high level scripting language code is required to describe each of the various systems.

Spinach was validated by modeling the Tigon-2 programmable Ethernet controller by Alteon Websystems, running actual compiled code Ethernet processing firmware and by comparing the reported results to actual hardware benchmarks. Spinach was also used to obtain new insights into the performance of Gigabit and 10 Gigabit network interfaces both in terms of hardware architecture and firmware parallelization strategies. *Public Website: https://sourceforge.net/projects/spinach/*

Rice University, Houston, Texas USA
Software Engineering and Consulting **2000**
Implemented instruction selection and register allocation optimizations in UHFFT, an adaptive and portable software library for the Fast Fourier Transform. Performed in depth analysis of register pressure, compiler generated spill code, memory hierarchy utilization, and instruction selection for non–trivially sized FFT matrices running on commercially available hardware platforms. Utilized reverse Cuthill–McKee technique to achieve near optimal computation orderings and minimize live data set sizes, as well as optimize register allocation and instruction selection phases of compilation.

Select Expert Witness, Consultant Engagements

Netlist, Inc.* v. Micron Technology, Inc., Micron Semiconductor Products, Inc., Micron Technology Texas LLC
Irell & Manella LLP, CA, USA
Expert Witness in HBM Computer Memory Technology **2025 - Present**
Case Subject Matter - Expert Witness in computer memory modules and high storage capacity HBM memory technology.
Work Performed - Expert consulting (to date).

BMW of North America LLC* v. Foras Technologies Ltd.
Finnegan, Henderson, Farabow, Garrett & Dunner, LLP, GA, USA
Expert Witness in Fault Tolerant Multiprocessor Systems **2024 - Present**
Case Subject Matter - Fault tolerant recovery in multiprocessor system architectures.
Work Performed - Expert consulting, multiple IPR declarations (to date).

Barco, Inc. et al.* v. Yealink (USA) Network Technology Co. Ltd
K&L Gates LLP, CA, USA
Expert Witness in Wireless Communications Systems **2024 - Present**
Case Subject Matter - Wireless communications systems and computer peripherals for content sharing.
Work Performed - Expert consulting, claim construction declarations, depositions (to date).

HL Klemove Corp.* v. Foras Technologies Ltd.
Arnold & Porter Kaye Scholar LLP, CA, USA
Expert Witness in Multiprocessor Systems **2024**
Case Subject Matter - Fault tolerant recovery in multiprocessor system architectures.
Work Performed - Expert consulting, expert declaration.

Labrador Diagnostics LLC* v. Biofire Diagnostics, LLC and Biomerieux, S.A.
Irell & Manella LLP, CA, USA
Expert Consulting in Medical Device Software and Systems **2024 - Present**

Case Subject Matter - Consultant in medical testing equipement hardware, software and computer networking technology.
Work Performed - Expert consulting, reverse engineering, declarations (to date).

Mercedes-Benz USA, LLC v. Daedalus Prime LLC*
Ascenda Law Group, CA, USA
Expert Witness in Multicore Systems, Memory and Power Mgmt **2024 - 2025**
Case Subject Matter - Dynamic power management in heterogeneous CPU/GPU systems, interconnects and memory systems.
Work Performed - Expert consulting, multiple IPR declarations, multiple depositions.

Samsung Electronics Co., LTD v. Headwater Research LLC*
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Computer Networking Technology **2024 - Present**
Case Subject Matter - Wireless/cellular networking technology as it relates to mobile devices and messaging.
Work Performed - Expert consulting, IPR declaration, deposition.

Samsung Electronics Co., LTD v. Headwater Research LLC*
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Wireless Networking Technology **2024**
Case Subject Matter - Wireless networking technology as it relates to mobile devices and secure communication.
Work Performed - Expert consulting, IPR declaration.

SEVEN Networks, Inc.* v. Motolola Mobility LLC
McKool Smith LLP, NY, USA
Expert Witness in Mobile Device Power Management **2023 - 2024**
Case Subject Matter - Power management hardware and software systems in mobile devices.
Work Performed - Expert consulting, expert reports, deposition.

Viasat, Inc. v. Western Digital Techs., Inc*
Gibson, Dunn & Crutcher, LLP, CA, USA
Expert Witness in Computer Memory Technology **2023 - 2024**
Case Subject Matter - Error correction technology for non-volatile memory, and non-volatile memory system design.
Work Performed - Expert consulting.

Valtrus Innovations LTD* v. SAP America, Inc. and SAP, SE
Reichman Jorgensen LLP, CA, USA
Expert Witness in Multiprocessor Systems and Caching Technology **2023 - 2025**
Case Subject Matter - Multiprocessor systems, computer architecture, cache and memory systems, secure computing.
Work Performed - Expert consulting, expert declarations, depositions.

Valtrus Innovations LTD* v. AT&T Inc., et al
Reichman Jorgensen LLP, CA, USA
Expert Witness in Multiprocessor Systems and Caching Technology **2023 - 2024**
Case Subject Matter - Multiprocessor systems, dynamic cache partitioning and related technology.
Work Performed - Expert consulting, claim construction declarations, deposition, Markman hearing tutorials.

BMW of North America LLC* and Robert Bosch LLC* v. Foras Technologies Ltd.
Finnegan, Henderson, Farabow, Garrett & Dunner, LLP, GA, USA

Expert Witness in Multiprocessor Systems **2023 - Present**
Case Subject Matter - Fault tolerant recovery in multiprocessor system architectures, including firmware related functionality.
Work Performed - Expert consulting, expert IPR declarations, depositions (to date).

Sonrai Memory Limited* v. Micron Technology, Inc.
BC Law Group PC, NY, USA
Expert Witness in Volatile and Non-Volatile Memory Technology **2023 - 2024**
Case Subject Matter - Expert Witness in volatile and non-volatile memory technology, including power systems.
Work Performed - Expert consulting, expert reports, depositions.

Micron Technology Inc. v. Sonrai Memory Limited*
BC Law Group PC, NY, USA
Expert Witness in Volatile and Non-Volatile Memory Technology **2023 - 2024**
Case Subject Matter - Expert Witness in volatile and non-volatile memory technology, including power systems.
Work Performed - Expert consulting, multiple IPR declarations, multiple depositions.

AGIS Software Development, LLC* v. Samsung Electronics Co., Ltd. et. al
Fabricant LLP, NY, USA
Expert Witness in Mobile Devices and Systems **2023 - 2024**
Case Subject Matter - Expert Witness in mobile devices and location tracking software and systems.
Work Performed - Expert consulting.

Samsung Electronics Co. Ltd. and Samsung Semiconductor, Inc. v. Netlist, Inc.*
Netlist, Inc.* v. Google LLC, Alphabet Inc., Samsung Electronics Co., Ltd. and Samsung Semiconductor, Inc.
Irell & Manella LLP, CA, USA
Expert Witness in Computer Memory and Module Architecture **2023**
Case Subject Matter - Expert Witness in computer memory module architecture, self testing, DRAM and related technologies.
Work Performed - Expert consulting, claim construction declaration, deposition.

Netlist, Inc.* v. Micron Technology, Inc.; Micron Semiconductor Products, Inc.; Micron Technology Texas LLC
Irell & Manella LLP, CA, USA
Expert Witness in Computer Memory and Module Architecture **2023 - Present**
Case Subject Matter - Expert Witness in computer memory modules, high capacity HBM technology, and issues relating to performance and power.
Work Performed - Expert consulting, expert reports, depositions (to date).

Samsung Electronics Co., Ltd v. Netlist, Inc*
Irell & Manella LLP, CA, USA
Expert Witness in Computer Memory **2022 - 2023**
Case Subject Matter - Expert Witness in multiple IPRs related to high bandwidth stacked memory architectures.
Work Performed - Expert consulting, IPR declarations, depositions.

Daedalus Prime LLC* v. Samsung Electronics Co., Ltd. et. al
Bluepeak Law Group LLP, NY, USA
Expert Witness in Dynamic Power Management **2023**
Case Subject Matter - Dynamic power management of multicore processors, memory systems and related domains.

Work Performed - Expert consulting.

Certain Semiconductors and Devices and Products Containing the Same, Including Printed Circuit Boards, Automotive Parts, and Automobiles, Inv. No. 337-TA-1332
Daedalus Prime LLC*
Reichman Jorgensen LLP, CA, USA
Expert Witness in Dynamic Power Management **2022**
Case Subject Matter - Dynamic power management of multicore processors, memory systems and related domains.
Work Performed - Expert consulting.

Definitive Holdings LLC v. Powerteq LLC*
Proskauer Rose LLP, NY, USA
Expert Witness in Automotive Software and Hardware **2022 - 2023**
Case Subject Matter - Automotive engine control software, hardware and related technology.
Work Performed - Expert consulting, declarations.

Aire Technology Ltd.* v. Apple Inc.
Aire Technology Ltd.* v. Google LLC
Aire Technology Ltd.* v. Samsung Electronics Co., Ltd. et. al
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Computer Hardware Design **2022**
Case Subject Matter - Computer hardware design as it relates to Near Field Communication.
Work Performed - Expert consulting, declarations, deposition testimony.

WSOU Investments, LLC* v. ZTE Corporation et. al
Kasowitz Benson Torres LLP, NY, USA
Expert Witness in Video and Telecommunications Computing **2022 - 2023**
Case Subject Matter - Expert Witness in hardware and software design as it relates to video codec technologies and telecommunications processing.
Work Performed - Expert consulting and expert declaration.

Robert Zeidman* v. Lindell Management LLC
Bailey Glasser LLP, Washington DC, USA
Expert Witness in Computer Software and Networking **2022 - 2023**
Case Subject Matter - Expert Witness in computer software and networking as it pertains to voting machines used in the United States 2020 Presidential Election.
Work Performed - Expert consulting, expert reports, testimony at hearing.

Netlist, Inc.* v. Samsung Electronics Co., Ltd. et. al
Irell & Manella LLP, CA, USA
Expert Witness in Computer Memory and Module Architecture **2022 - 2023**
Case Subject Matter - Expert Witness in computer memory modules, high capacity HBM technology, and issues relating to performance and power.
Work Performed - Expert consulting, expert reports, depositions, trial testimony.

Samsung Electronics Co., Ltd v. Netlist, Inc*
Irell & Manella LLP, CA, USA
Expert Witness in Computer Memory **2022 - 2023**
Case Subject Matter - Expert Witness in multiple IPRs related to computer memory module architecture, including DRAM and related technologies.
Work Performed - Expert consulting, IPR declarations, depositions.

Scott and White Health Plan and SHA, LCC d/b/a FirstCare* v. Actian, Corporation

Germer, Beaman & Brown PLLC, TX, USA
Expert Witness in Computer Software **2022 - Present**
Case Subject Matter - Expert Witness in computer software and related licensing and copyright matters.
Work Performed - Expert consulting (to date).

Idan Bar-Asher et. al v. Playtika Holding Corp., et. al Ltd*
Labaton Sucharow LLP, Washington D.C., USA
Expert Witness in Mobile Software and Systems **2022 - 2024**
Case Subject Matter - Expert witness in mobile gaming software and systems development as it relates to federal securities laws and Initial Public Offerings (IPOs).
Work Performed - Expert consulting.

Maxell Ltd* v. Lenovo Group Ltd., et. al
Mayer Brown LLP, Washington D.C., USA
Expert Witness in Power Management **2022 - 2023**
Case Subject Matter - Expert Witness in the area of mobile devices, microprocessors and power management.
Work Performed - Expert consulting.

Q Technologies, Inc.* v. Walmart, Inc.
Q Technologies, Inc.* v. Neutron Holdings, Inc. d/b/a/ LIME
Kane Russell Coleman & Logan PC, TX, USA
Expert Witness in Mobile Payments Systems **2021 - 2024**
Case Subject Matter - Expert Witness in the area of mobile payments processing systems.
Work Performed - Expert consulting, infringement expert reports, depositions.

Samsung Electronics Co., Ltd v. Netlist, Inc*
Gibson Dunn & Crutcher LLP, CA, USA
Expert Witness in Computer Memory **2021 - 2022**
Case Subject Matter - Expert Witness in computer memory module architecture, self testing, DRAM and related technologies.
Work Performed - Expert consulting, IPR declarations, depositions.

Sonrai Memory Limited* v. Oracle Corporation
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Memory and Compression Technology **2021 - 2022**
Case Subject Matter - Memory controllers, memory technology and data compression technology.
Work Performed - Expert consulting, claim construction, declarations, depositions.

Certain Laptops, Desktops, Servers, Mobile Phones, Tablets, and Components Thereof, Inv. No. 337-TA-1280
Sonrai Memory Limited*
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Low Power Systems **2021 - 2022**
Case Subject Matter - System on chips, operating systems and system components related power consumption in computing devices.
Work Performed - Expert consulting, claim construction declarations, expert reports, depositions.

Future Link Systems LLC* v. Advanced Microdevices, Inc.
Future Link Systems LLC* v. Apple, Inc
Future Link Systems LLC* v. Broadcom, Inc; Broadcom Corp.
Future Link Systems LLC* v. Qualcomm, Inc.; Qualcomm Technologies
Future Link Systems LLC* v. Realtek Semiconductor Corp.

Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Circuit Design, Interconnects and Test **2021 - 2022**
Case Subject Matter - Semiconductor circuit design and reuse, memory design and test, PCI Express and related interconnect technologies.
Work Performed - Expert consulting, claim construction, declarations, depositions.

Certain UMTS and LTE Cellular Communications Modules and Products and Products Containing the Same, Inv. No. 337-TA-1240
Philips RS North America LLC and Koninklijke Philips N.V.*
Foley & Lardner LLP, MA, USA
Expert Witness in Wireless Computing Technology **2020 - 2021**
Case Subject Matter - Embedded computing technology related to wireless mobile devices, including 3GPP standards based functionality.
Work Performed - Expert consulting, expert reports, deposition, trial testimony.

Acqis* v. Samsung Electronics Co., LTD
Robins Kaplan LLP, USA
Expert Witness in Mobile Devices and Interconnects **2021**
Case Subject Matter - Chip and chipset interconnect technology relating to mobile and non-mobile devices.
Work Performed - Expert consulting, expert reports, depositions.

Neodron Limited* v. Texas Instruments, Inc
Neodron Limited* v. Cypress Semiconductor Corp
Neodron Limited* v. Renesas Electronics Corp
Neodron Limited* v. ST Microelectronics N.V.
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Touch Screen Technology and Related Systems **2020 - 2021**
Case Subject Matter - Expert witness in hardware/software systems for touch screen technology, including analog and digital signaling and processing.
Work Performed - Expert consulting, declarations.

Qualcomm Inc. v. Monterey Research LLC*
Desmarais LLP, NY, USA
Expert Witness in Memory Systems Technology **2021**
Case Subject Matter - SRAM and DRAM technology, memory system burst functionality and related matters.
Work Performed - Expert consulting, IPR declarations, depositions.

Advanced Micro Devices Inc. v. Monterey Research LLC*
Desmarais LLP, NY, USA
Expert Witness in Memory Systems, Interconnects **2021**
Case Subject Matter - SRAM and DRAM technology, multi-ported memory systems, boot technology and related technologies.
Work Performed - Expert consulting, IPR declarations, depositions.

Analog Devices Inc. v. Xilinx Inc.*
Morrison & Foerster LLP, CA, USA
Expert Witness in FPGAs and Configurable Computing **2020 - 2021**
Case Subject Matter - FPGAs and solutions related to crossbar interconnects, high speed transceivers, and configurable computing.
Work Performed - Expert consulting, IPR declarations, depositions.

TriOptima AB v. Quantile Technologies Limited*

Caldwalader Wickersham & Taft, New York, USA
Expert Witness in Source Code for FinTech Systems **2020**
Case Subject Matter - Software technology implementations of financial services related to compression and derivatives markets.
Work Performed - Expert consulting, source code review.

Unified Patents LLC v. JustService.net LLC*
Sheridan Ross P.C., Colorado, USA
Expert Witness in Virtual Data Storage Systems **2020 - 2021**
Case Subject Matter - Web enabled virtual data storage systems for backup, storing and transferring of data.
Work Performed - Expert consulting, declarations, depositions.

Karya Property Management, LLC* v. ResMan, LLC
Baker Botts LLP, Houston, Texas, USA
Expert Witness in Distributed Software Systems **2020 - 2021**
Case Subject Matter - Expert witness in the areas of distributed software systems, including data base technologies, as they relate to property management software and related systems.
Work Performed - Expert consulting, claim construction, IPR declarations, CBM declarations, depositions, expert reports.

Certain Touch-Controlled Mobile Devices, Computers, and Components Thereof, Inv. No. 337-TA-1193
Neodron Limited*
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Touch Screen Technology and Related Systems **2020**
Case Subject Matter - Expert witness in hardware/software systems for touch screen technology in mobile devices.
Work Performed - Expert consulting.

VLSI Technology LLC* v. Intel Corporation
Irell & Manella LLP, Los Angeles, CA USA
Expert Witness in Computer Architecture **2020 - 2021**
Case Subject Matter - Expert witness in the area of computer architecture, microprocessors and power management.
Work Performed - Expert consulting and source code review, expert reports, depositions, trial testimony.

Optimum Imaging Technologies LLC* v. Canon Inc.
Ruyak Cherian LLP, Washington D.C., USA
Expert Witness in FPGA Based Image Processing Systems **2019 - 2021**
Case Subject Matter - Expert witness and consultant in the area of heterogeneous FPGA/DSP/CPU based systems as applied to image and video processing technology.
Work Performed - Expert consulting, claim construction declarations, expert reports, depositions, IPR declarations.

Dish Network, LLC v. Contemporary Display LLC*
Toler Law Group, P.C., Texas., USA
Expert Witness in Real Time Video Processing **2020**
Case Subject Matter - Expert Witness in real-time video processing technology over the Internet, including related user interfaces and quality of service.
Work Performed - Consulting, IPR declarations, deposition.

Dish Network, LLC v. Contemporary Display LLC*

Toler Law Group, P.C., Texas., USA
Expert Witness in Real Time Video Processing **2020**
Case Subject Matter - Expert Witness in real-time video processing technology over Internet, including related user interfaces and quality of service.
Work Performed - Consulting, IPR declarations, deposition.

Multimedia Content Management LLC* **v. Dish Network LLC**
Sheridan Ross P.C., Colorado, USA
Expert Witness in Real Time Video Processing **2019 - 2020**
Case Subject Matter - Expert Witness in Internet based real-time video processing set top boxes, and related content processing and distribution.
Work Performed - Expert consulting.

Exegy Inc. et al v. ACTIV Financial Systems, Inc.*
Wolf Greenfield & Sachs P.C., USA
Expert Witness High Speed Computing for Financial Services **2019 - 2021**
Case Subject Matter - Expert Witness in microprocessor and FPGA based system design for high speed financial services, high speed RDMA systems, and related technology.
Work Performed - Expert consulting, IPR declarations, depositions.

Certain Touch-Controlled Mobile Devices, Computers, and Components Thereof, Inv. No. 337-TA-1162
Neodron Limited*
Russ, August, and Kabat LLP, Los Angeles, CA, USA
Expert Witness in Touch Screen Technology and Related Systems **2019 - 2020**
Case Subject Matter - Expert witness in hardware/software systems for touch screen technology in mobile devices.
Work Performed - Expert consulting, claim construction declaration, expert reports, depositions.

Maxell, Ltd., et al.,* **v. Apple Inc.**
Mayer Brown LLP, Washington D.C., USA
Expert Witness in Embedded Computer Architecture **2019 - 2021**
Case Subject Matter - Expert witness and consulting engineer in low power computing and power management.
Work Performed - Expert consulting, claim construction declaration, claim construction deposition, expert reports, infringement and validity depositions.

Nuvoton Technology Corporation* **v. Microchip Technology Inc.**
Finnegan, Henderson, Farabow, Garrett & Dunner, Washington D.C., USA
Expert Witness in Embedded Computer Architecture **2019 - 2020**
Case Subject Matter - Expert witness in embedded memory system hardware, direct memory access engines, memory controllers, and analog/digital and digital/analog ASICs.
Work Performed - Expert consulting, declarations, claim construction deposition, IPR declarations, deposition.

Shuttlewagon Inc.*, **v. Innovative Quality Solutions, LLC**
Stroz Friedberg, Massachusetts, USA
Expert Witness in Embedded Computing **2019**
Case Subject Matter - Expert witness in Programmable Logic Controllers (PLCs), IEC 61131 IE / CodeSys and real-time computing as it pertains to industrial equipment, as well as misappropriation of proprietary technology.
Work Performed - Expert consulting.

RDM, Inc. v. Citoc Inc.*

Citoc Incorporated, Texas, USA
Expert Witness in Cloud / Web Based Computing **2019**
Case Subject Matter - Expert witness cloud deployed, web based, infrastructure management software and software solutions deployment. Work Performed - Expert consulting.

ResMan, LLC v. Karya Property Management, LLC et al.*
Beck Redden LLP, Texas, USA
Expert Witness in Software Design **2019 - 2021**
Case Subject Matter - Expert witness in trade secret matters related to design and architecture of consumer facing software products.
Work Performed - Expert consulting, expert reports, depositions, trial testimony.

Qualcomm* v. Apple Inc.
Case No. 3:17-cv-02398-DMS-MDD
Quinn Emanuel Urquhart & Sullivan, CA, USA
Expert Witness in Mobile Devices and Computer Architecture **2019**
Case Subject Matter - Expert witness in mobile devices, computer architecture, and software system design for wireless communications.
Work Performed - Expert consulting.

Vasu Networks Corporation*
Skiermont Derby, Texas, USA
Consulting Expert in Cellular Network Technologies **2019**
Case Subject Matter - Consulting expert in matters related to Single Radio Voice Call Continuity, Dual Radio Voice Call Continuity, and various heterogeneous wireless technologies and standards committees related to seamless connectivity.
Work Performed - Consulting expert.

Qualcomm* v. Apple Inc.
Case No. 37-2017-00041389-CU-BC-NC
Quinn Emanuel Urquhart & Sullivan, CA, USA
Expert Witness in Mobile Devices and Computer Architecture **2018 - 2019**
Case Subject Matter - Expert witness in mobile devices, computer architecture, and software system design for wireless communications.
Work Performed - Expert consulting.

Qualcomm* v. Apple Inc.
Inv No. 337-TA-1093
Quinn Emanuel Urquhart & Sullivan, CA, USA
Expert Witness in Mobile Devices and Computer Architecture **2017 - 2018**
Case Subject Matter - Expert witness in mobile devices, computer architecture, and software system design for wireless communications.
Work Performed - Expert consulting, expert reports, depositions, trial testimony.

Qualcomm* v. Apple Inc.
Quinn Emanuel Urquhart & Sullivan, CA, USA
Case No. 3:17-CV-1375-DMS-MDD
Expert Witness in Mobile Devices and Computer Architecture **2018 - 2019**
Case Subject Matter - Expert witness in wireless mobile devices, computer architecture, and software system design.
Work Performed - Expert consulting, expert reports, depositions, trial testimony.

Redzone Wireless LLC v. Netgear Inc.*

Bird Marella, CA, USA
Expert Witness in Wireless Hardware/Software Systems **2018 - 2019**
Case Subject Matter - Manufacturing of software and hardware used in wireless routers and base stations, including chipsets and software solutions.
Work Performed - Expert consulting, expert reports, depositions.

Nvidia* **v. ZiiLabs Corporation**
Quinn Emanuel Urquhart & Sullivan, NY, USA
Expert Witness in GPU Architecture, Computer Architecture **2018**
Case Subject Matter - Expert witness in the areas of Graphics Processor (GPU) architectures, memory systems architectures, and microprocessor design.
Work Performed - Expert consulting.

Acqis* **v. EMC Corporation**
Cooley LLP, CA, USA
Expert Witness in Computer Architecture **2017 - 2018**
Case Subject Matter - Expert witness in the areas of PCI, PCI-Express, system-on-chip technology, and computer memory technologies.
Work Performed - Expert consulting.

Qualcomm* **v. Apple Inc.**
Certain Mobile Electronic Devices and Radio Frequency and Processing Components Thereof, Inv No. 337-TA-1065
Quinn Emanuel Urquhart & Sullivan, CA, USA
Expert Witness in Mobile Devices and Computer Architecture **2017 - 2018**
Case Subject Matter - Expert witness in mobile devices, computer architecture, and software system design.
Work Performed - Expert consulting, expert reports, depositions.

Network Management Solutions* **v. AT&T Mobility et. al**
IP Law Leaders, Washington DC, USA
Expert Witness in Cellular Network Management **2017**
Case Subject Matter - Expert witness in mobile devices, wireless technology, 3GPP standards, and alarm management.
Work Performed - Expert consulting.

Certain Memory Modules and Components Thereof, and Products Containing Same, Investigation No. 337-TA-1023
Netlist* **v. S.K. Hynix**
Mintz Levin Cohn Ferris Glovsky and Popeo PC, Boston, MA, USA
Expert Witness in Computer Architecture and Memory Systems **2016 - 2017**
Case Subject Matter - Expert witness in the area of JEDEC standards essential DRAM memory module technology, relating to DIMM, R-DIMM and LR-DIMM as it applies to server based computing.
Work Performed - Expert consulting, source code review, declarations, expert reports, depositions, ITC trial testimony.

Certain Audio Processing Hardware, Software, and Products Containing Same, Inv. No. 337-TA-1026
Andrea Electronics Corporation*
Pepper Hamilton, LLP, Washington, DC, USA
Expert Witness in Audio Processing Hardware and Software **2017**
Case Subject Matter - Expert witness in hardware/software based digital signal processing systems audio processing and noise cancellation technology.

Work Performed - Expert consulting.

Specialized Monitoring Solutions, LLC v. Lutron Electronics Co., Inc.*
Vinson & Elkins LLP, Texas USA
Expert Witness in Embedded and Distributed Software Systems **2017**
Case Subject Matter - Expert witness in embedded software and hardware systems, as well as distributed data storage and sensing.
Work Performed - Expert consulting.

Huawei Technologies Co., Ltd.*, v. Samsung Electronics America, Inc. et al
Sidley Austin LLP, California USA
Expert Witness in 4G and Legacy Cellular Technologies **2016 - 2017**
Case Subject Matter - Expert witness in 4G and legacy cellular technologies.
Work Performed - Expert consulting, affidavits, claim construction.

Godo Kaisha IP Bridge 1* v. Broadcom Limited et. al
Ropes & Gray LLP, New York USA
Expert Witness in Computer Architecture **2016 - 2017**
Case Subject Matter - Consultant in the area of ARM based embedded computing architecture and system on-chip technology. Reverse engineering of VHDL, Verilog and RTL based technologies, as it pertains to multicore system architectures.
Work Performed - Expert consulting, source code review, claim construction.

Huawei Technologies Co. Ltd.* v. T-Mobile US, Inc. and T-Mobile USA, Inc.
Fish & Richardson P.C., Texas USA
Expert Witness in 4G and Legacy Cellular Technologies **2016 - 2017**
Case Subject Matter - Expert witness in 4G and legacy cellular technologies.
Work Performed - Expert consulting, claim construction, affidavits.

ACI Worldwide Corp. v. Mastercard International Incorporated*
Armstrong Teasdale LLP, Missouri, USA
Expert witness regarding financial transaction systems **2016 - 2017**
Case Subject Matter - Expert witness in trade secret misappropriation as it pertains to middleware message passing systems and financial transaction networks.
Work Performed - Expert consulting, source code review, declarations, expert reports, depositions.

Sony Computer Entertainment America v. Rothschild Digital Media Innovations*
Carey Rodriguez Milian Gonya, LLP, Florida, USA
Expert witness regarding distributed multimedia systems **2016**
Case Subject Matter - Expert witness in the area of distributed computing systems and multimedia technologies.
Work Performed - Expert consulting, declarations, expert reports, depositions.

DTS, Inc., et al. v. Nero AG, et al.*
Glaser Weil Fink Jacobs Howard Avchen & Shapiro, Los Angeles CA, USA
Expert witness regarding distributed multimedia systems **2016**
Case Subject Matter - Expert witness in the area of software solutions for audio and video codecs.
Work Performed - Expert consulting, source code review, experimental analysis, expert reports, depositions.

Advanced Silicon Technologies*
Mintz Levin Cohn Ferris Glovsky and Popeo PC, Boston, MA, USA
Expert Consultant in Microprocessor Architecture, Intellectual Property **2015 - 2016**
Case Subject Matter - Consultant in the area of computer architecture and microprocessor tech-

nologies, specifically related to memory systems.
Work Performed - Expert consulting.

Certain Audio Processing Hardware and Software and Products Containing the Same, ITC Inv. No. 337-TA-949
Lenovo (United States), Inc.*
Toshiba Corp
Akin Gump Strauss Hauer & Feld LLP, Philadelphia, PA, USA
Expert Witness in Digital Signal Processing, Intellectual Property **2015 - 2016**
Case Subject Matter - Expert witness in hardware/software based digital signal processing systems tailored for noise cancellation technology.
Work Performed - Expert consulting, source code review, claim construction, expert reports, deposition.

Intel Corporation v. Future Link Systems*
Irell & Manella LLP, Los Angeles, CA USA
Expert Witness in Computer Architecture **2015 - 2018**
Case Subject Matter - Expert witness in the areas of PCI, PCI-Express, system-on-chip technology, and computer memory technologies.
Work Performed - Expert consulting, source code review, declarations, expert reports, deposition.

Advanced Touchscreen and Gesture Technologies, LLC* v. Samsung Electronics, America, Inc., et al.
Robins Kaplan LLP, Intellectual Property, Minnesota, USA
Expert Witness in Mobile Devices and User Interfaces **2015 - 2017**
Case Subject Matter - Expert witness in the analysis and reverse engineering of software systems pertaining to mobile devices, and human computer interfaces.
Work Performed - Expert consulting, declarations, expert reports.

Intellectual Ventures* v. Ericsson et al.
Dechert LLP, Los Angeles, CA, USA
Expert Witness in 3GPP standards and LTE Technologies, Intellectual Property 2014 - 2016
Case Subject Matter - Expert witness in 3GPP standards as they pertain to LTE cellular communications networks, in addition to system hardware and software design.
Work Performed - Expert consulting, source code review, declarations, claim construction, tutorials.

Papst Licensing GMBH & Co. KG.*
DiNovo & Price Ellwanger Hardy, Austin, TX USA
Expert Witness in FPGA Technologies, Intellectual Property **2014 - 2016**
Case Subject Matter - Consultant in FPGA computing platforms and design flow processes, prior art, and infringement analysis.
Work Performed - Expert consulting, claim construction.

Locata LBS* v. Paypal Inc., et al.
Glaser Weil Fink Jacobs Howard Avchen & Shapiro, Los Angeles, CA, USA
Expert Witness in Geofencing Systems, Intellectual Property **2014 - 2015**
Case Subject Matter - Expert witness in geofencing technology, geolocational technology, and systems architecture as it pertains to mobile cellular telecommunications and enterprise software systems.
Work Performed - Expert consulting, claim construction, expert reports, deposition testimony.

Cell and Network Selection LLC v. ZTE*
Pillsbury, Winthrop Shaw & Pittman, San Diego, CA, USA

Expert Witness in 3G/4G Cellular Technology, Intellectual Property **2014 - 2015**
Case Subject Matter - Expert witness in technology pertaining to 3G, 3.5G, 3.75G and 4G wireless handset technology.
Work Performed - Expert consulting, claim construction, expert reports, deposition testimony.

CA Inc. D/B/A CA Technologies* v. AppDynamics, Inc.
Bracewell & Giuliani, Houston, TX, USA
Holland & Knight, Boston MA USA
Expert Witness in Enterprise Software Monitoring, Intellectual Property **2014 - 2015**
Case Subject Matter - Expert witness in technology pertaining to dynamic runtime profiling of distributed software applications, specifically around Java and .NET technologies.
Work Performed - Expert consulting, source code review, declarations, expert reports, deposition testimony.

M Seven System Limited v. Leap Wireless International, Inc.* et al.
Glaser Weil Fink Jacobs Howard Avchen & Shapiro, Los Angeles, CA, USA
Expert Witness in 3G/4G Feature Phone Software Systems, Intellectual Property **2014**
Case Subject Matter - Expert witness in the area of mobile telecommunications technology, particularly cellular handset hardware and software design.
Work Performed - Expert consulting, source code review.

Lunareye v. Passtime*.
Conley Rose, P.C., Austin, TX, USA
Expert Witness in GPS Tracking Solutions **2014**
Case Subject Matter - Expert witness in the area of mobile GPS tracking solutions software and hardware systems.
Work Performed - Expert consulting.

Certain Wireless Devices With 3G and/or 4G Capabilities and Components Thereof, ITC Inv. No. 337-TA-868
Interdigital, Inc.*
Wilson, Sonsini, Goodrich & Rosati LLP, Austin, TX, USA
Expert Witness in 3G/4G Cellular Technology, Intellecutal Property **2013 - 2015**
Case Subject Matter - Expert witness in software systems and hardware systems, as they pertain to 3G/4G cellular communications and standards.
Work Performed - Expert consulting, source code review, claim construction, declarations, expert report, depositions, ITC trial testimony.

Investment Technology Group* v. United States Internal Revenue Services
Expert Witness in Financial Services Technology **2013**
Case Subject Matter - Expert witness in the area of high performance software systems targeting financial market services.
Work Performed - Expert consulting, source code review, declarations, depositions, testimony at hearing.

Carrier Corporation v. Goodman Manufacturing*, et al.
Baker Botts LLP, Houston, TX USA
Expert Witness in Software and Hardware Systems, Intellectual Property **2013 - 2014**
Case Subject Matter - Expert witness in the area of microprocessor based, serial distributed communications systems.
Work Performed - Expert consulting, source code review.

Gametek LLC* v. Facebook Inc. et al.
Collins, Edmonds, Porgorzelski, Schlather & Tower PLLC, Houston, TX USA

Expert Witness in Mobile Gaming Technologies, Intellectual Property **2013**
Case Subject Matter - Expert witness in internet based client-server software systems for mobile and web browser based gaming technology.
Work Performed - Expert consulting, source code review.

Ultimate Pointer LLC* v. Nintendo Co. LTD et al.
Conley Rose P.C., Houston, TX USA
Expert Witness in Console Based Video Game Technology, Intellectual Property 2013 - 2015
Case Subject Matter - Expert witness in hardware and software systems for console based video game technology.
Work Performed - Expert consulting, source code review, declarations, expert reports, deposition testimony.

Alliantgroup, L.P. v. Tax Point Advisors*
Jeffrey Feingold and Tax Point Advisors, Houston, TX USA
Expert Witness in Internet Technology **2013**
Case Subject Matter - Expert witness in IP based internet technology, packet spoofing and information systems.
Work Performed - Expert consulting, declarations.

Kerry T. Thibodeaux, M.D. v. American Lifecare Inc.*
Cox, Cox Filo, Camel & Wilson, Lake Charles, LA USA
Expert Witness in Medical Software Systems **2013**
Case Subject Matter - Expert witness in medical billing and expense recording enterprise software systems.
Work Performed - Expert consulting.

Opelousas General Hospital Authority et al v. Fairpay Solutions Inc*
Cox, Cox Filo, Camel & Wilson, Lake Charles, LA USA
Expert Witness in Medical Software Systems **2013**
Case Subject Matter - Expert witness in medical billing and expense recording enterprise software systems.
Work Performed - Expert consulting.

Wi-LAN USA, Inc. and Wi-LAN, Inc.* v. Alcatel-Lucent USA Inc.
Vinson Elkins LLP, Dallas, TX USA
Expert Witness in 3GPP LTE Technology, Intellectual Property **2012 - 2013**
Case Subject Matter - Reverse engineering, analysis and education of counsel in the 3GPP LTE specification, and related software and hardware systems.
Work Performed - Expert consulting, source code review, claim construction, expert declarations.

Wi-LAN USA, Inc. and Wi-LAN, Inc.* v. Ericsson Inc., and Telefonaktiebolaget LM Ericsson
Vinson Elkins LLP, Dallas, TX USA
Expert Witness in 3GPP LTE Technology, Intellectual Property **2012 - 2013**
Case Subject Matter - Reverse engineering, analysis and education of counsel in the 3GPP LTE specification, and related software and hardware systems.
Work Performed - Expert consulting, source code review, claim construction, expert declarations.

E-Contact Technologies, LLC v. Dell Inc.*, et al.
Baker Botts LLP, Houston, TX USA
Expert Witness in Mobile Operating Systems, Intellectual Property **2012**
Case Subject Matter - Reverse engineering and analysis of the Android operating system as it per-

tained to mobile and tablet computing devices. Source code reverse engineering, system architecture and related analysis.
Work Performed - Expert consulting, source code review.

CheckFree Corporation* and CashEdge, Inc.* v. Metavante Corporation and Fidelity National Information Services, Inc.
Paul, Weiss, Rifkind, Wharton & Garrison LLP, New York, NY USA
Expert Witness in Banking and Billing Software Systems, Intellectual Property **2012**
Case Subject Matter - Software systems analysis and reverse engineering of large scale software based financial billing systems. Source code reverse engineering, claim chart generation, expert report generation and testimony.
Work Performed - Expert consulting, source code review.

Realtime Data, LLC v. NASDAQ*, Chase Bank*, Goldman Sachs* et al.
Proskauer Rose LLP, New York, NY USA
Expert Witness High Performance Software Systems, Intellectual Property **2012**
Case Subject Matter - Expert witness for joint defense counsel in the matter of large scale high frequency financial data aggregation platforms.
Work Performed - Expert consulting, claim construction, technical tutorials, declaration, expert reports, deposition testimony.

Realtime Data, LLC v. Thomson Reuters* et al.
Vinson & Elkins LLP, Austin, TX USA
Consultant in High Performance Software Systems, Intellectual Property **2011 - 2012**
Case Subject Matter - Expert witness for joint defense counsel in the matter of large scale high frequency financial data aggregation platforms.
Work Performed - Expert consulting, claim construction, technical tutorials, declaration, expert reports, deposition testimony.

General Electric Co.* v. Mitsubishi Heavy Industries Ltd.
Weil, Gotshal & Manges LLP, Dallas, TX USA
Expert Witness in Hardware/Software Analysis, Intellectual Property **2010 - 2011**
Case Subject Matter - Reverse engineering of real-time embedded system software source code and hardware system architecture pertaining to variable speed wind turbines and FPGA based sub-systems.
Work Performed - Expert consulting, declarations, source code review.

Atlantic Specialty Insurance et al v. AE Outfitters Retail Company*, et al
Smith Mazure Director Wilkins Young & Yagerman, P.C., NY USA
Expert Witness in Embedded Hardware/Software Systems **2011**
Case Subject Matter - Hardware and software system analysis of real-time networked embedded computing systems as it pertains to fire alarm infrastructure and fault handling.
Work Performed - Expert consulting, technical tutorial, expert declarations.

Gamestop*, Inc v. Bexar Appraisal
Brusniak and Blackwell PC, Dallas, TX USA
Expert Witness in Software Analysis, Intellectual Property Litigation **2011**
Case Subject Matter - Expert witness on the tangibility of software as it pertains to embedded computing, networking, and gaming platforms.
Work Performed - Expert consulting, expert declarations.

Quality Analytic Systems, Inc. v. Zebec Data Systems*
Rymer, Moore, Jackson & Echols, P.C., Houston, TX USA
Expert Witness in Software Systems **2011**

Case Subject Matter - Reverse engineering and software analysis of enterprise level internet based medical billing software systems.
Work Performed - Expert consulting, source code review, declarations, arbitration.

Passlogix, Inc. v. 2FA Inc.*
Expert Witness in Smart Card Middleware Solutions, Trade Secret Exposure **2010**
Case Subject Matter - Trade secret analysis of software and systems architecture as it pertains to optimal selection of smart card middleware solutions on a given computer system.
Work Performed - Expert consulting, expert declarations.

Terra Nova Sciences*. v. JOA Oil and Gas, B. V. et al.
Abraham & Watkins et al. LLP, Houston, TX USA
Expert Witness in Software Systems, Intellectual Property Litigation **2010**
Case Subject Matter - Expert software analyst of algorithms and geomechanics modeling systems as they pertain to oil well reservoirs.
Work Performed - Expert consulting, source code review.

Paltalk Holdings, Inc.* v. Sony Computer Entertainment America Inc. et al.
Heim Payne & Chorush LLP, Houston, TX USA
Software Analysis Expert, Intellectual Property Litigation **2010**
Case Subject Matter - Reverse engineering of internet based client-server video game console and server software architecture.
Work Performed - Expert consulting, source code review, infringement analysis.

Technomedia International, Inc.* v. International Training Services, Inc., et al.
Bracewell & Giuliani, LLP, Houston, TX USA
Expert Witness in Software Analysis, Contract Dispute **2010**
Case Subject Matter - Web enabled teaching materials as it pertains to oil well drilling. Analysis of internet based audio and video content delivery mechanisms and related website architecture.
Work Performed - Expert consulting, expert reports.

Gamestop, Inc* v. Bexar Appraisal
Brusniak and Blackwell PC, Dallas, TX USA
Expert Witness in Software Analysis, Tax Dispute **2009 - 2010**
Case Subject Matter - On the tangibility of software as it pertains to embedded computing, networking, and gaming platforms.
Work Performed - Expert consulting, expert reports.

Whetstone Electronics, LLC* v. Epson America, et al.
DiNovo & Price Ellwanger Hardy, Austin, TX USA
Expert Witness in System Analysis, Intellectual Property Litigation **2009 - 2011**
Case Subject Matter - Embedded computing systems pertaining to printer technology and computer hardware acceleration (microprocessors, DSP, FPGA and CPLD).
Work Performed - Expert consulting.

Whetstone Electronics, LLC* v. Xerox Corporation, et al
DiNovo & Price Ellwanger Hardy, Austin, TX USA
Expert Witness in System Analysis, Intellectual Property Litigation **2009 - 2011**
Case Subject Matter - Embedded computing systems pertaining to printer technology and computer hardware acceleration (microprocessors, DSP, FPGA and CPLD).
Work Performed - Expert consulting.

General Electric, Inc.* v. Mitsubishi Heavy Industries, Inc.
Vinson & Elkins LLP, Austin, TX USA

Expert Witness in Hardware and Software Analysis, Intellectual Property **2008 - 2009**
Case Subject Matter - Real time embedded computing and hardware/software designs for variable speed wind turbines, including digital signal processing DSP and FPGA based subsystems.
Work Performed - Expert consulting, source code review, technical tutorials, declarations, expert reports, depositions, ITC trial preparation.

Paltalk Holdings, Inc.* v. Microsoft Corporation
Heim Payne & Chorush LLP, Houston, TX USA
Technical Expert, Intellectual Property Litigation **2007 - 2008**
Case Subject Matter - Internet based client server console gaming architecture for real time experience.
Work Performed - Expert consulting, source code review, technical tutorials.

SuperSpeed Software, LLC* v. IBM Corporation
Heim Payne & Chorush LLP, Houston, TX USA
Technical Expert in Software Analysis, Intellectual Property Litigation **2007 - 2008**
Case Subject Matter - Computer database technology, parallel file systems and clustered computing.
Work Performed - Expert consulting, technical tutorial, source code review.

QPSX Developments 5 Pty Ltd.* v. Juniper Networks, Inc.
Fulbright and Jaworski LLP, Houston, TX USA
Technical Consultant, Intellectual Property Litigation **2006 - 2007**
Case Subject Matter - Data transmission algorithms for computer networks.
Work Performed - Consulting, claim construction, claim chart preparation, technical tutorials.

Commonwealth Scientific and Indus. Research Org.* v. Buffalo Tech. Inc.
Fulbright and Jaworski LLP, Houston, TX USA
Technical Consultant, Intellectual Property Litigation **2006 - 2007**
Case Subject Matter - High speed data rate network for wireless local area networks.
Work Performed - Consulting, claim construction, claim chart preparation, technical tutorials.

Microsoft Corporation v. Commonweatlh Scientific and Indus. Research Org.*
Fulbright and Jaworski LLP, Houston, TX USA
Technical Consultant, Intellectual Property Litigation **2006 - 2007**
Case Subject Matter - High speed data rate communications for wireless local area networks.
Work Performed - Consulting, claim construction, claim chart preparation, technical tutorials.

Tantivy Communications, Inc.* v. Lucent Technologies, Inc.
Fulbright and Jaworski LLP, Houston, TX USA
Technical Consultant, Intellectual Property Litigation **2004 - 2005**
Case Subject Matter - CDMA2000 based cellular networks, including data retransmission algorithms at multiple layers.
Work Performed - Consulting, claim construction, claim chart preparation, technical tutorials.

Volunteer Organizations

Rice Alliance for Technology and Entrepreneurship Austin, Texas, USA
Executive Committee **2009 - Present**
The Rice Alliance for Technology and Entrepreneurship strives to improve the entrepreneurial ecosystem of Central Texas by: helping entrepreneurs successfully found, fund, grow and exit new companies, helping investors successfully identify and engage with promising new ventures, and showcasing emerging technologies and business models to further educate and engage the community.

Capital Factory, TX USA
Mentor **2014 - Present**
Mentor, advisor and investor in one of the most successful start-up accelerators in the United States.

OwlSpark - Rice University, Houston, Texas, USA
Mentor **2014**
Mentor and advisor to university based early stage technology companies within Rice University's accelerator program.

Incubation Station, TX USA
Mentor **2013**
Incubation Station is an accelerator that brings together a consortium of Austins notable entrepreneurs, investors and advisors for the purpose of mentoring high-potential, market-validated consumer product companies to more effectively manufacture, distribute, market and grow their products and services.

Honors and Awards

Texas Instruments Fellowship Recipient
Nokia Grant Recipient
National Science Foundation Grant Recipient
Rice University Fellowship Recipient
Rensselaer Alumni Scholarship Recipient
Linear Tech / Mueller Scholarship Recipient
Rensselaer Polytechnic Institute: Graduated Cum Laude, Deans List All Semesters
Eta Kappa Nu - National Electrical and Computer Engineering Honors Society
IEEE Member - Institute of Electrical and Electronics Engineers
ACM Member - Association For Computing Machinery

Appendix B

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

In the following charts, I provide analysis for the Barco ClickShare CX-30 and ClickShare Button (the "Barco System") and certain claims of U.S. Patent Nos. 10,762,002 (BARCO_0002692) (the "'002 Patent"); 10,795,832 (BARCO_0005137) (the "'832 Patent"); 10,904,103 (BARCO_0007517) (the "'103 Patent"); 11,258,676 (BARCO_0008254) (the "'676 Patent"); 11,403,237 (BARCO_0009616) (the "'237 Patent"); and 11,422,951 (BARCO_0010815) (the "'951 Patent") (collectively, the "Asserted Patents"). My analysis below is for exemplary purposes only, and I understand that other products, such as the ClickShare C-5, C-10, CX-20, CX-50, CX-50 Gen 2, CB Core, and CB Pro are also compatible with the ClickShare Button and accordingly, may also practice the exemplary claims of each Patent.

I also understand that Yealink has admitted its products infringe claims 1-7 and 10 of the '002 Patent, 1-4, 6-8, 13-14, and 16-19 of the '832 Patent, 1-2, 16-17, and 19-20 of the '103 Patent, 1-20 of the '676 Patent, 1-5, 7-8, and 19 of the '237, and 1-15 and 17-21 of the '951 Patent. In the following charts, I identify what products Yealink has admitted infringe the certain claims of the Asserted Patents.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

US Patent No. 10,762,002

Claim	Barco System	Yealink System
1. [pre] A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a communications protocol for communication between the processing device and a class of peripheral devices, the method comprising:	ClickShare Button provides a process for connecting a processing device (e.g., a laptop computer) to a communications network as set forth in claim 1. ClickShare Button connects the processing device to a communications network. **ClickShare Button or App?** **You choose.** Plug the ClickShare Button into your laptop and you're connected in seconds. Even guests can join this way. Or enjoy the full ClickShare experience and get access to advanced benefits with the free Desktop App. BARCO_0066514.[1] ClickShare Button provides network connectivity through a wireless transmission protocol: **General specifications** Connectors: USB-C type Authentication protocol: WPA2-PSK in stand alone mode; WPA2-PSK or IEEE 802.1X in network integration mode Wireless transmission protocol: IEEE 802.11 a/b/g/n/ac Frequency band: 2.4 GHz and 5 GHz BARCO_0066545. The processing device includes a memory, display, and operating systems with pre-installed generic drivers. The processing device communicates with a class of peripheral devices (e.g., USB devices). USB devices are a standard class of peripheral devices that are driven by pre-installed generic drivers. USB provides a generic communication protocol for communication between the processing device and a class of	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[1] Annotations have been added to various figures to specifically identify certain portions of the figure.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	peripherals. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[a1] a) coupling an external peripheral device physically to a port of the processing device,	ClickShare Button is capable of coupling physically to a port of a processing device, such as a laptop computer:  BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[a2] wherein the peripheral device comprises a wireless transceiver and a connector, said connector configured to couple to the port of the processing device;	ClickShare Button includes a wireless transceiver and a connector configured to couple to the port of the processing device:	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	General specifications Connectors: USB-C type Authentication protocol: WPA2-PSK in stand alone mode; WPA2-PSK in IEEE 802.1X in network integration mode Wireless transmission protocol: IEEE 802.11 a/b/g/n/ac Frequency band: 2.4 GHZ and 5 GHz BARCO_0066545. ClickShare Button includes a wireless transceiver with Wi-Fi capabilities. ClickShare Button includes a connector (e.g., USB interface). This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067524. I agree that the Yealink System practices this claim element.
[b1] b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and	The processing device includes a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device ClickShare Button and the processing device. ClickShare Button utilizes a number of devices which use pre-installed generic drivers: [redacted]	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	BARCO_0067519. The ClickShare Button utilizes the USB audio drivers on the processing device. The audio related devices are set up by means of pre-installed generic drivers. The pre-installed generic drivers are a means for audio communication between ClickShare Button and the processing device. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[b2] by means of a second preinstalled generic driver of the operating system, a means for data communication between the peripheral device and the processing device;	Processing device includes a second pre-installed generic driver of the operating system, as a means for data communication between peripheral device ClickShare Button and the processing device. ClickShare Button is used to perform wireless presentation and video conferencing which includes communicating video data from screenscraping:  BARCO_0067538.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	Video data requires a second preinstalled generic driver for data communication between the peripheral device and the processing device. Video data is screenscraped on the processing device and utilizes the HID driver to pass the video data to the peripheral device. The HID interface uses a second preinstalled generic driver as a means for data communication between the secondary device and the processing device. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[c] c) using the peripheral device to connect the processing device to a communications network via the wireless transceiver;	ClickShare Button is configured to connect the processing device to a communications network via a wireless transceiver. ClickShare Button connects a processing device to a communications network. ClickShare Button has a wireless transceiver with 802.11 a/b/g/n/ac/ax capabilities, as shown below: **General specifications** **Connectors** USB-C type **Authentication protocol** WPA2-PSK in stand-alone mode WPA2-PSK or IEEE 802.1X in network integration mode **Wireless transmission protocol** IEEE 802.11 a/b/g/n/ac **Frequency band** 2.4 GHz and 5 GHz BARCO_0066545. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[d] d) routing audio data from the processing device to the wireless transceiver via the	ClickShare Button is configured to route audio data from the ClickShare Button transceiver via the connector and means for audio communication. When ClickShare Button is connected to the processing device, the audio is routed via the means for audio communication to ClickShare Button via the connector.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
connector of the peripheral device and the means for audio communication and routing the audio data from the wireless transceiver of the peripheral device to a base node over the communications network, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.	ClickShare Button routes audio data to a ClickShare Conference, ClickShare Video Bar, or ClickShare Present ("ClickShare Room System"), over the communications network. The transfer of audio data uses a generic audio driver, usbaudio.sys. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
5. The method of claim 1, wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.	ClickShare Button includes a client application configured to run on the processing device to obtain screen scaped data. For example, ClickShare Button includes an executable program that is available on the ClickShare Button storage drive: [redacted]	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	BARCO_0067518. After running the executable program, the ClickShare Button allows presentation of the screen of the host processing device. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

US Patent No. 10,795,832

Claim	Barco System	Yealink System
1. A peripheral device comprising: [a] a base,	ClickShare Button is a peripheral device that includes a base:  BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[b] connector configured to connect to a serial plug and play port of a host processing device,	ClickShare Button includes a connector configured to connect to a serial plug and play port of a host processing device, like a laptop for example:	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I agree that the Yealink System practices this claim element.
[c] a flexible connection between the base and the connector configured to transfer data signals and power, and,	ClickShare Button includes a flexible connection that connects the base and the connector which transfers data signals and power:	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[d] wherein the base has electronics comprising a wireless transceiver and a processing engine, wherein said wireless transceiver and the processing engine are configured to connect the peripheral device directly to a wireless communications network, and	ClickShare Button includes a wireless transceiver and processing engine that are configured to connect ClickShare Button directly to a wireless communications network. For example, ClickShare Button can communicate via the IEEE 802.11 a/b/g/n/ac protocol: General specifications Connectors: USB-C type Authentication protocol: WPA2-PSK in standard client mode; WPA2-PSK or IEEE 802.1X in network integration mode Wireless transmission protocol: IEEE 802.11 a/b/g/n/ac Frequency band: 2.4 GHz and 5 GHz BARCO_0066545.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[e] a physical actuator on the base being configured to actuate a signal and to transfer the signal to the connector to transfer to the serial plug and play port via at least one pre-installed generic driver for the port,	ClickShare Button includes a physical actuator that allows transfer of a signal from the ClickShare Button to the serial plug and play port via at least one pre-installed generic driver. For example, pressing a button allows communication of data for presentation from a processing device's screen:  BARCO_0067538. ClickShare Button utilizes a number of devices with associated pre-installed generic drivers: [redacted]	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

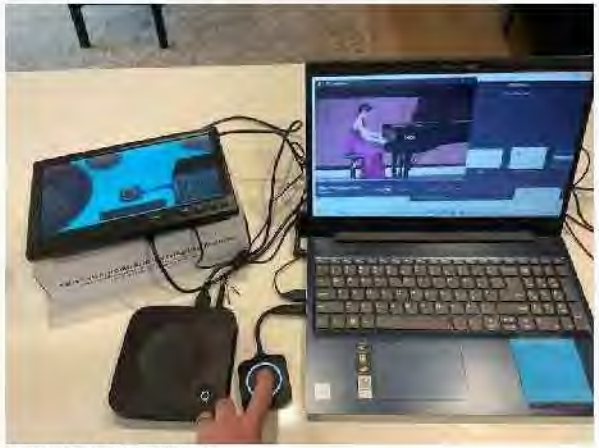
[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	One device that uses a pre-installed generic driver is a HID interface which transfers the signal between the connector and to the serial plug and play port. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[f] and the serial plug and play port is configured to receive thereafter image data displayed on the host processing device,	ClickShare Button is configured to receive thereafter image data displayed on the host processing device as evidence by the screen shared content in the image below:  BARCO_0067538. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
[g] wherein the physical actuator is configured to be activated by a user action applied to the physical actuator which triggers delivery of the image data from the host processing device via the serial plug and play port to the wireless transceiver, and from the wireless transceiver to the wireless communications network.	ClickShare Button is configured to trigger image data from the host processing device when a user action is applied to the physical actuator. For example, in the image below, no image data is displayed on the Monitor connected to the CX-30 immediately before the ClickShare Button is pressed.  BARCO_0067536. Then, in the image below which is taken after the ClickShare Button is pressed, image data is shown in the Monitor from the Test Machine.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067538. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

US Patent No. 10,904,103

Claim	Barco System	Yealink System
1. A computer peripheral device comprising: [a] a base,	ClickShare Button is a computer peripheral device that includes a base:  BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[b] a connector for connection to a serial plug and play port of a host processing device	ClickShare Button includes a connector configured to connect to a serial plug and play port of a host processing device, like a laptop for example:	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I agree that the Yealink System practices this claim element.
[c] a flexible connection between the base and the connector,	ClickShare Button includes a flexible connection that connects the base and the connector which transfers data signals and power:	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[d] a transceiver for communicating with a communications network,	ClickShare Button includes a wireless transceiver for communicating with a communications network. For example, ClickShare Button can communicate via the IEEE 802.11 a/b/g/n/ac protocol: General specifications Connectors: USB-C type Authentication protocol: WPA2-PSK in stand alone mode; WPA2-PSK or IEEE 802.1X in network integration mode Wireless transmission protocol: IEEE 802.11 a/b/g/n/ac Frequency band: 2.4 GHz and 5 GHz BARCO_0066545. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
[e] a physical actuator on the base configured to allow user action to actuate the physical actuator to trigger transfer of a signal to the connector to transfer to the serial plug and play port via at least one pre-installed generic driver for the serial plug and play port, and	ClickShare Button includes a physical actuator on its base configured to allow user action to actuate the physical actuator to trigger transfer of a signal to the connector to transfer to the serial plug and play port. For example, pressing a button allows communication of data for presentation of a processing device's screen, which requires transfer of a signal:  BARCO_0067538. ClickShare Button utilizes a number of devices with associated pre-installed generic drivers: [redacted] One device that uses a pre-installed generic driver is a HID interface which transfers the signal between the connector and the serial plug and play port.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

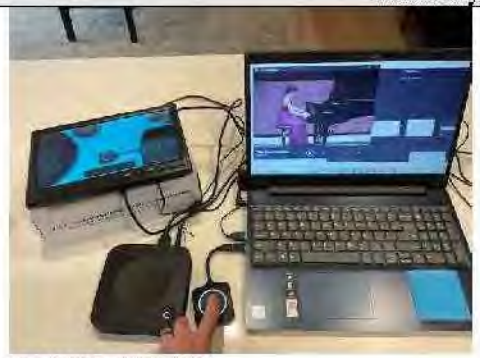
[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[f] the serial plug and play port being configured to receive arbitrary media content on the host processing device,	ClickShare Button is configured to receive arbitrary media content on the host processing device as evidence by the screen shared content in the image below:  BARCO_0067538. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[g] wherein the base has a visual indicator which is also activated by the user action applied to the physical actuator,	ClickShare Button has a visual indicator which is activated by the user action applied to the physical actuator. For example, the visual indicator before content is shared is white, as shown in the image below:	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067536. Then, once the physical actuator is pressed, content from the Test Machine is shared via the ClickShare Button and CX-30 to the Monitor, and the visual indicator is red, as shown in the image below:  BARCO_0067538. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
[h] wherein the physical actuator is configured to be activated by the user action applied to the physical actuator to trigger delivery of the arbitrary media content on the host processing device to said transceiver on the computer peripheral device through said serial plug and play port, and from the transceiver to the communications network,	The physical actuator, when activated by the user action, triggers delivery of arbitrary media content (e.g., screen scraped data) on the host processing device to the transceiver on the ClickShare Button, and to the communications network as shown with respect to limitation 1[g] of the '103 Patent. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[i] wherein the visual indicator is configured in a way such that the user action by actuating the physical actuator indicates to the user whether or not the arbitrary media content is being sent from the at least one peripheral device to the communications network.	The visual indicator of the ClickShare Button is configured to indicate whether or not arbitrary media content is sent from the peripheral device to the communications network as with respect to limitation 1[g] of the '103 Patent. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

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Appendix B: Commercial Embodiments Analysis

US Patent No. 11,258,676

Claim	Barco System	Yealink System
1. [pre] A method for connecting one or more processing devices, each processing device being a user device of one participant in a meeting with a plurality of participants, to a wireless communications network having a base node with one or more first displays, the one or more processing devices each having a memory, a second display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between the processing device and a class of peripheral devices, the method comprising the following steps for each processing device:	The Barco System provides a process for connecting a processing device such as a laptop computer to a communications network. For example, the ClickShare Button connects the processing device to a communications network to share screen scraped data as shown below:  BARCO_0067538. As depicted, the communications network also includes a base node (e.g., a CX-30) with a display. Likewise, a processing device includes a display, operating system, and at least one generic driver. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[a] (a) coupling a peripheral device to the processing device, the	ClickShare Button can be coupled to a processing device:	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
peripheral device having a wireless transceiver;	 BARCO_0067536. ClickShare Button also includes a wireless transceiver: **General specifications** Connectors: USB-C type Authentication protocol: WPA2-PSK in stand alone mode; WPA2-PSK or IEEE 802.1X in network integration mode Wireless transmission protocol: IEEE 802.11 a/b/g/n/ac Frequency band: 2.4 GHZ and 5 GHz BARCO_0066545 This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
[b] b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;	ClickShare Button is configured to set up communication with a processing device using pre-installed generic drivers on the operating system of the processing device. ClickShare Button presents itself as a mass storage device, a human interface device (HID) or a composite device: [redacted] BARCO_0067524. Each of these devices use preinstalled generic drivers which may be used as a means for communication between the ClickShare Button and the processing device. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[c1] c) coupling the processing device to the wireless communications network via the peripheral device;	ClickShare Button is configured to share data from the processing device to other devices on the communication network. For example, after the ClickShare Button is connected to a processing device, it permits data communication:	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067538. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067497. I agree that the Yealink System practices this claim element.
[c2] running a client application stored on the peripheral device to obtain screen scraped data;	ClickShare Button stores a client application capable of running on the processing device. For example, when the ClickShare Button is connected to the Test Machine, the ClickShare executable file is available:	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067508.  This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I agree that the Yealink System practices this claim element.
[d] d) routing the screen scraped data between the processing device	ClickShare Button routes screen scraped data between the processing device and wireless communications network for display on the one or more first displays of the base node:	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
and the wireless communications network via the means for communication for display on the one or more first displays of the base node, wherein the generic communication protocol is used for transferring the screen scraped data for display between the processing device and the peripheral device; and	 BARCO_0067538. I also understand from my discussion with Erwin Six on April 24, 2025 that the data is communicated from the processing device to the base node as described. I further reserve the right to supplement this analysis.	WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[e] e) obtaining electronic access to one or more first displays for display of the screen scraped data;	The ClickShare Button obtains electronic access to the display for displaying screen scraped content as shown with respect to limitation 1[d]. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
		I agree that the Yealink System practices this claim element.
[f] the method further comprising: displaying the screen scraped data on the one or more first displays in accordance with a set of rules, one of the rules being a forcing rule, wherein the forcing rule is that display on the one or more first displays of new screen scraped data is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another participant, the new screen scraped data of any participant for displaying overrides or replaced any data displayed on the one or more first displays from the same or another participant of the meeting.	ClickShare Room systems are configured to receive and display screen scraped data from multiple ClickShare Buttons each connected to processing devices based on a set of rules. For example, The ClickShare Conference models CX-30, CX-50, and CS-50 Gen2 support two sources simultaneously displayed on the screen. BARCO_0066437. I also understand from my discussion with Erwin Six on April 24, 2025 that the Barco System includes a forcing rule as claimed. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
2. The method of claim 1 further comprising loading a server program onto the base node, the server	The Clickshare system loads a server program configured to receive screen scraped data from one or more processing devices and displaying the screen scraped data on one or more first displays.	I understand Yealink has admitted that the MeetingBar A20 or MeetingBoard, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod infringe, this claim

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
program receiving screen scraped data from one or a plurality of client processing devices, and displaying the screen scraped data on one or more first displays, the server program allowing display in accordance with one or more rules of which one is a forcing rule, wherein the forcing rule is that the display on the one or more first displays is obtained by the action of only one participant involved in the meeting, without requiring the agreement of another participant, new screen scraped data of any participant for display overrides or replaces any data displayed on the one or more first displays from the same or another participant of the meeting.	The Clickshare system is configured to display screen scraped data based on a set of rules. See 1[f] which is incorporated by reference. The server program enables this feature. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

US Patent No. 11,403,237

Claim	Barco System	Yealink System
1. [pre] A method for connecting a processing device to a communications network, the processing device having a memory, a display, an operating system and communication between the processing device and a class of peripheral devices, the method comprising:	ClickShare Button provides a process for connecting a processing device such as a laptop computer to a communications network. For example, the ClickShare Button connects the processing device to a communications network to share screen scraped data as shown below:  BARCO_0067538. A processing device, like a laptop computer for example, includes a memory, display, operating system, and communications between the processing device and peripheral devices. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[a1] a) coupling an external peripheral device physically to a port of the processing device, the external	ClickShare Button can be coupled physically to a port of the processing device:	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
peripheral device having a transceiver and a connector to couple to the port of the processing device, and	 BARCO_0067536. ClickShare Button also includes a wireless transceiver: **General specifications** Connectors: USB-C type Authentication protocol: WPA2-PSK in stand alone mode; WPA2-PSK or IEEE 802.1X in network integration mode Wireless transmission protocol: IEEE 802.11 a/b/g/n/ac Frequency band: 2.4 GHZ and 5 GHz BARCO_0066545. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
[a2] presenting the external peripheral device to the processing device as a human interface device;	ClickShare presents itself to the processing device as multiple devices including a human interface device: [redacted] This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
[b] b) communicating at least one of audio data and display data from the processing device to the external peripheral device via the human interface device;	ClickShare Button communicates at least one of audio data or display data from the processing device to the external peripheral device via the human interface device. For example, in the image below both display data and audio data are shared on the Monitor coupled to the CX-30:  BARCO_0067538.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[c], c) reading the audio data from the port,	ClickShare Button reads data from the port as show with respect to limitation 1[b] of the '237 Patent described above. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
d] d) connecting the processing device to a communications network via the transceiver, and	ClickShare Button is configured to connect the processing device to the communications network via the transceiver as show with respect to limitation 1[b] of the '237 Patent described above. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
[e] e) display data and audio data being routed between the processing device and the communications network via the transceiver and further to a base node.	ClickShare Button routes audio data between the processing device and the communications network via the transceiver and further to a base node as show with respect to limitation 1[b] of the '237 Patent described above. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.
4. The method of claim 1, wherein a client application is stored on the external peripheral device which when run on the processing device obtains screen scraped data.	ClickShare Button stores a client application capable of running on the processing device and obtaining screen scraped data. For example, when the ClickShare Button is connected to the Test Machine, the ClickShare executable file is available: 	I understand Yealink has admitted that the WPP30 Presentation Pod and the WPP20 Presentation Pod, when used with a connected device, infringe this claim element.  BARCO_0067524. I agree that the Yealink System practices this claim element.

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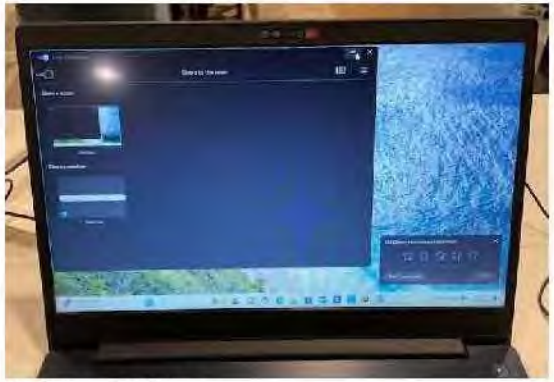
Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	BARCO_0067508. [redacted] Additionally, the portable application, when run, obtains screen scraped data that can be communicated to a base node:  BARCO_0067513. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	

[redacted] – [redacted]

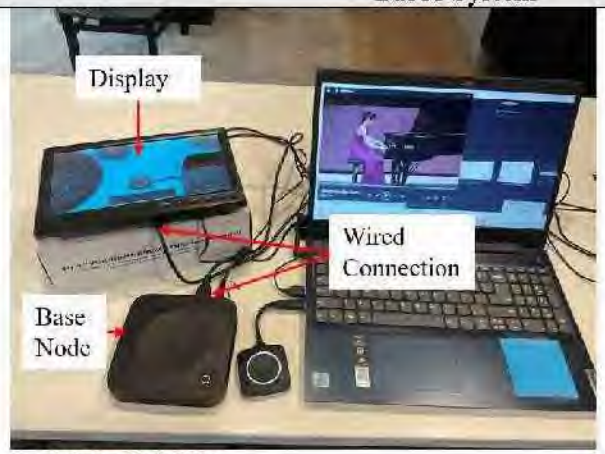
Appendix B: Commercial Embodiments Analysis

US Patent No. 11,422,951

Claim	Barco System	Yealink System
1. An electronic meeting tool for communicating user selected arbitrary media content from users at a meeting comprising:	The Barco System provides an electronic meeting tool for communicating arbitrary media content from users at a meeting:  BARCO_0067538.	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[a] a base node, the base node being coupled to a first display,	The CX-30 may be coupled to a display:	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067537. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067497. I agree that the Yealink System practices this claim element.
[b] the base node being adapted to receive user selected arbitrary media content from at least one peripheral device via a wireless communications network,	The CX-30 is also adapted to receive user selected arbitrary media content from the ClickShare Button via a wireless communications network: 	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	BARCO_0067538. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067524. I agree that the Yealink System practices this claim element.
[c] and [the base node being adapted to] to control display of the user selected arbitrary media content on the first display; and	The Barco System is adapted to control the display of the user selected arbitrary media content on the first display as shown with respect to 1[b] of the '951 Patent. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[d] the at least one peripheral device being adapted to communicate the user selected arbitrary media content to the wireless communications network;	ClickShare Button is adapted to communicate the arbitrary media content over the wireless communications network. For example, the ClickShare Button includes a wireless transceiver capable of transmission over IEEE 802.11 a/b/g/n/ac transmission protocol:	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	General specifications Connectors: USB-C type Authentication protocol: WPA2-PSK in stand alone mode; WPA2-PSK or IEEE 802.1X in network integration mode Wireless transmission protocol: IEEE 802.11 a/b/g/n/ac Frequency band: 2.4 GHZ and 5 GHz BARCO_0066545. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[e] wherein the at least one peripheral device is a connection unit comprising:	ClickShare Button is a connection unit: 	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	BARCO_0067536. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[f] (a) a connector adapted to couple to a port of a user processing device, the user processing device having a second display and a memory,	ClickShare Button includes a connector adapted to couple to a port of a user pricing device, such as, a laptop computer:  BARCO_0067537. A laptop computer includes a second display and a memory. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with WPP30 Presentation Pod or the WPP20 Presentation Pod infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[g] (b) a transmitter for transferring user selected arbitrary media content to the wireless communications network, and	ClickShare Button includes a transmitter capable of transferring user selected media content over the wireless communication network as shown with respect to limitation 1[d] of the '951 Patent.	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	 BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.
[h] (c) an input device configured to allow the user to carry out a user action on the input device	ClickShare Button includes an input device (e.g., a button) that allows a user action:  BARCO_0067537.	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[i] that triggers transfer of said user selected arbitrary media content from the transmitter to the wireless communications network and to the base node through the wireless communications network for display on the first display,	ClickShare Button includes an input device (e.g., a button) that triggers transfer of media content from the transmitter to the wireless communications network and to the base node through the wireless communications network. For example, prior to pressing the button on the ClickShare Button, media content is not shared from the processing device, as shown in the image below:  BARCO_0067537. Then, once the physical actuator is pressed, content from the Test Machine is shared via the ClickShare Button and CX-30 to the Monitor, as shown in the image below:	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497. I agree that the Yealink System practices this claim element.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
	 BARCO_0067538. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	
[j] the input device being a physical actuator coupled to the at least one peripheral device.	The input device of the ClickShare Button is a physical actuator as shown with respect to limitations 1[h] and 1[i] of the '951 Patent. This interpretation is consistent with discussions I had with Erwin Six on April 24, 2025 regarding how the Barco System functions. I further reserve the right to supplement this analysis.	I understand Yealink has admitted that the MeetingBar A20, MeetingBoard, or RoomCast, when used with the WPP30 Presentation Pod or the WPP20 Presentation Pod, infringe this claim element.  BARCO_0067524.  BARCO_0067497.

[redacted] – [redacted]

Appendix B: Commercial Embodiments Analysis

Claim	Barco System	Yealink System
		I agree that the Yealink System practices this claim element.